1892 Vol. XLVII

MARCH 29th, 1945

FLIGHT

and

AIRCRAFT ENGINEER

OFFICIAL ORGAN OF THE ROYAL AERO CLUB

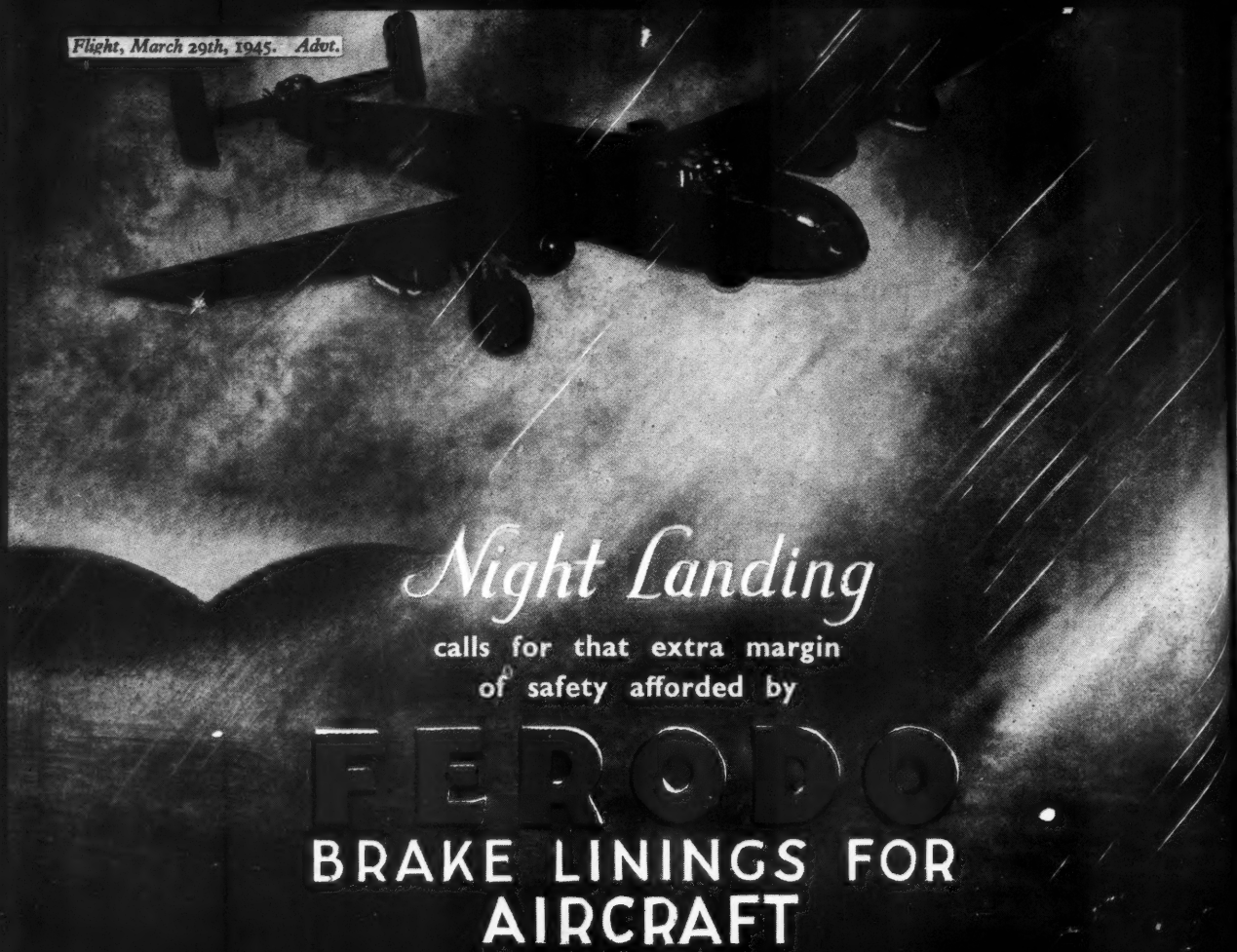
ONE SHILLING

PRESSURE SENSITIVE

K·D·G

Instruments

K. D. G. INSTRUMENTS LIMITED. CROYDON. ENGLAND



Night Landing

calls for that extra margin
of safety afforded by

FERODO

BRAKE LININGS FOR AIRCRAFT

The outcome of long and extensive experience in the manufacture and practical application of friction materials, **FERODO BRAKE LININGS FOR AIRCRAFT, FERODO CLUTCH DISCS** and **FEROBESTOS** non-metallic **BUSHES**, etc., feature prominently in modern Aircraft specifications.

The facilities afforded by the **FERODO TEST HOUSE** where all kinds of brakes are subjected to the most searching tests, are freely at the disposal of Industry at all times.

FERODO LIMITED · CHAPEL-EN-LE-FRITH

REGD. TRADE MARK FERODO

FLIGHT
and
AIRCRAFT ENGINEER

FIRST AERONAUTICAL WEEKLY IN THE WORLD : FOUNDED 1909

Editor
C. M. POULSEN

Managing Editor
G. GEOFFREY SMITH, M.B.E.

War Correspondent
JOHN YOXALL

Editorial, Advertising and Publishing Offices: DORSET HOUSE, STAMFORD STREET, LONDON, S.E.1
Telegrams: Truditur, Sedist, London. Telephone: Waterloo 3333 (35 lines).

COVENTRY: 8-10, CORPORATION ST. Telegrams: Autocar, Coventry. Telephone: Coventry 5210.
BIRMINGHAM, 2: GUILDHALL BUILDINGS, NAVIGATION ST. Telegrams: Autopress, Birmingham. Telephone: Midland 2971 (5 lines).
MANCHESTER, 3: 260, DEANSGATE. Telegrams: Iliffe, Manchester. Telephone: Blackfriars 4412.
GLASGOW, C.2: 26B, RENFIELD ST. Telegrams: Iliffe, Glasgow. Telephone: Central 4857.

Registered at the G.P.O. as a Newspaper.

No. 1892. Vol. XLVII. March 29th, 1945 Thursdays. One Shilling.

The Outlook

"On the Other Side of the Hill"

FROM the earliest days of which there is record, it has always been the great desire of every General to know what was happening "on the other side of the hill." The phrase became quite proverbial. For several centuries it was the business of the cavalry to satisfy this desire, and even the late Lord Haig, in the early part of his career, impressed upon his officers that they must rely for information on the cavalry. But, as the cavalry could not penetrate everywhere, the resulting ignorance on the part of the general staff was described as "the fog of war."

A new era dawned with the Army manœuvres of 1912, when aircraft (both heavier and lighter than air) took part. In the retreat from Mons in 1914 aircraft told Sir John French about von Kluck's attempt to get past his left flank, and that ultimately resulted in the victory of the Marne. Since then the value of air reconnaissance to an Army has never been questioned, and in May, 1915, even Sir Douglas Haig (as he then was) postponed the attack on Aubers Ridge for a day because the weather had prevented the Royal Flying Corps from bringing him earlier information about the German positions.

The subsequent elaboration of other activities by Air Forces has never diminished the supreme value of air reconnaissance. Now there is a complication, because to gain the full advantage of it it is necessary for one's own fighters to obtain air superiority, and (if possible) air supremacy, over the enemy Air Force. The fighters must deny the air to the enemy and keep it open for the use of one's own reconnaissance machines.

Now the Allied Air Forces, mainly British and American, have won this happy position in N.W. Europe, in Italy, and in Burma. In the Battle of the Rhine their ascendancy has been particularly marked. Marshal von Rundstedt seems to have no idea of what General Eisenhower is likely to do next, and security silence has been imposed on war correspondents for fear they should tell the enemy what his own aircraft cannot discover for him. The armour of General Patton rushes ahead at full speed, and the Germans do not know which way to run to escape it.

Just lately the German jet-propelled aircraft, by means of their speed, have shown signs of gathering more information than Rundstedt has had for a long time past. But they have come on the scene late in the day, and so far their successes have not been spectacular. They must be countered by still faster Allied fighters; and the Allies are not behindhand in their development of jet propulsion.

Eggs and Omelettes

ONE of the many peculiarities of flying is that ultimate proficiency can only be gained by experience. The pilot must, in fact, find himself in serious difficulties several times before he learns either caution or the lessons which allow him to circumvent these difficulties. In training, consequently, it is essential to tread the narrow edge between excessive spoon-feeding and the kind of freedom which may involve an unnecessarily heavy loss in lives and aircraft.

For very good reasons the Air Ministry, in its training scheme, has made safety the key-word. The penalties for any form of unauthorised flying which might be considered to be dangerous have been very great, and both pupil and instructor have been brought up with the idea that an accident, however slight, is a slur on the flying character of those concerned.

With the best initial intentions in the world, this policy seems now, so far as we can gather, to tend towards "inhibiting" both pupils and instructors.

Necessary risks may not be taken, and the pupils may be leaving the training establishments without vital experience, and, worse still, with an inculcated fear of minor accident.

The most outstanding need at the moment appears to be practice in cross-wind landings—at least for fighter pilots. Nearly all the advanced airfields in the different theatres of war are one-way strips, laid out as the terrain permits and without regard to prevailing winds. On each side of the strip lies ground which is entirely unserviceable; ground-loops or run-offs are just not possible without damage.

Yet we believe the results of the fear of an excessive accident rate at training establishments are sometimes such that only very mildly cross-wind landings are permitted. Practice and still more practice in progressively more difficult conditions is the only way in which a safe cross-wind landing technique can be developed. It is a technique which grows on the pilots and which eventually becomes instinctive.

Surely it is better that second-line aircraft should be risked in any such mildly dangerous practice at training units than that almost irreplaceable first-line aircraft should be risked at the war fronts? In any case, one feels that an excessively safety-first outlook among operational pilots is not the best thing—and that, it seems, is being inevitably fostered by the present policy. It is a regrettable fact that omelettes cannot be made without breaking eggs, and if the eggs are handled too carefully, then the omelette may be a very funny-looking affair.

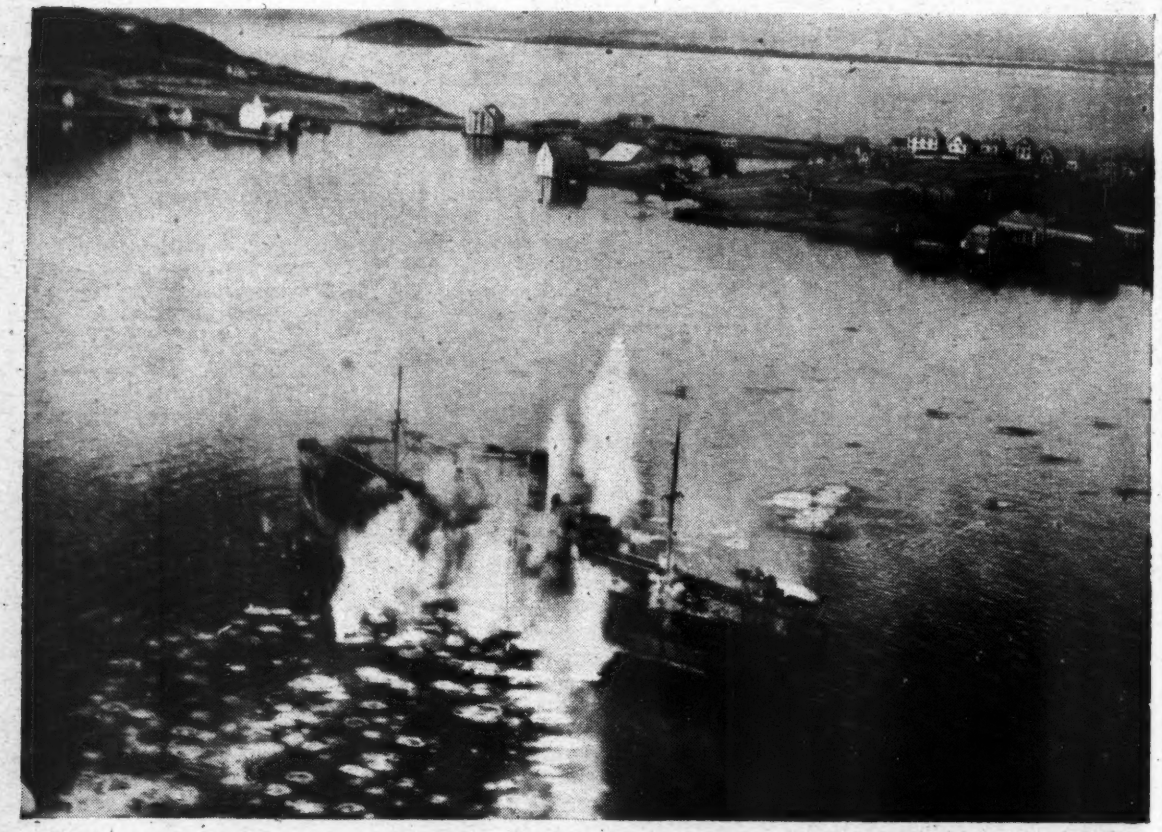
CONTENTS

The Outlook	327
War in the Air	329
Here and There	332
Sperry Attitude Gyro	334
P-38L Lightning	337
Sir Stafford Statistitises	338
"Jungle Angels"	338, a and b
Air-Age Education	339
B.O.A.C. Wartime Services	340
The Capetown Conference	343
British Air Transport	344
Correspondence	347
Service Aviation	348

Private Flying

ATTENTION has been called by the secretaries of the Royal Aero Club and the Automobile Association to the omission from the Government's White Paper of any mention of post-war private flying. That this omission was not unintentional may, perhaps, be inferred from the title of the White Paper, which was "British Air Transport." We fully agree with the view that private flying must be permitted after the war and that the flying clubs must be revived and enabled to obtain aircraft suitable for their purpose.

Another White Paper, on airports, is expected. It may possibly include the subject of private flying.



INSECTS IN NORWEGIAN FIORDS: On March 17th Mosquitoes of Coastal Command attacked enemy shipping at Aalesund. They left five out of six vessels on fire and smoking. The armed merchantman in this picture was hit by rocket projectiles.

FIREWORKS FOR THE JAPS: Boeing B-29 Superfortresses shower bombs on a supply depot near the Mingaladon airfield outside Rangoon. This daylight mission was described as "perfect."

WAR in the AIR

Mandalay Liberated : H.M. the King's Message : Hunting the Japanese Fleet : German Rout West of the Rhine

THE capture of Mandalay is a great success for British and Indian arms. The 19th Indian Division, a body which has won great honour for itself, entered it when the Japanese had evacuated Fort Dufferin after a lot of very hard fighting. Every success in Burma is shared by the Royal Air Force and its American companions. The Supreme Commander, Admiral Mountbatten, in a message to his forces, said: "These great land advances have only been made possible by the untiring efforts of the airmen." H.M. the King, too, in a message to Lord Louis, spoke of how the land forces had been "sustained by the Allied Air Forces."

The air supremacy in Burma has indeed been extraordinarily complete. In the first place, the credit goes to the fighters, who have prevented the enemy from interfering with our air operations. As a result, troops have been maintained by air on a scale never before contemplated.

As a contrast, the wretched Japanese have been cut off by our bombers from their bases at Rangoon and Bangkok. The Japanese Army in Burma is the largest that Nippon has deployed in any theatre of war; and it looks as if it is doomed to destruction.

Elsewhere the outlook before Japan is not much more rosy. It is ominous news for its leaders that the Americans have just launched the first of five new huge aircraft carriers, displacing 45,000 tons and able to carry in her hangars more than 80

A GERMAN "SCARECROW": This picture was taken by the R.A.F. Film Unit during the attack on Essen on March 11th.

WAR IN THE AIR

twin-engined aircraft. In attacking islands with ship-borne aircraft one needs numbers. The large carrier may present a more tempting target to the enemy bombers than a small one; but to get the necessary numbers of machines from small carriers one has to use a lot of them, and their mere numbers likewise make a tempting target. Submarines as well as enemy aircraft may attack them. Moreover, larger aircraft can be operated from a large carrier than from a small one; and that fact enables the carrier to lie further away from the danger points in the centre of the battle.

Last week the American fleet did a very daring deed. It sent a fast task force right into the Inland Sea, which lies between three of the principal islands of the Japanese archipelago. Its object was to find the main Japanese fleet, and it is believed that it did cripple a number of warships, most probably with bombs and air torpedoes. It is claimed that nearly 500 enemy aircraft were destroyed. The Japanese main fleet has not appeared yet in the present war, and now the Americans are hunting it. What would the British-trained Admiral Togo, the victor of Tsushima, have thought?

The German Rout

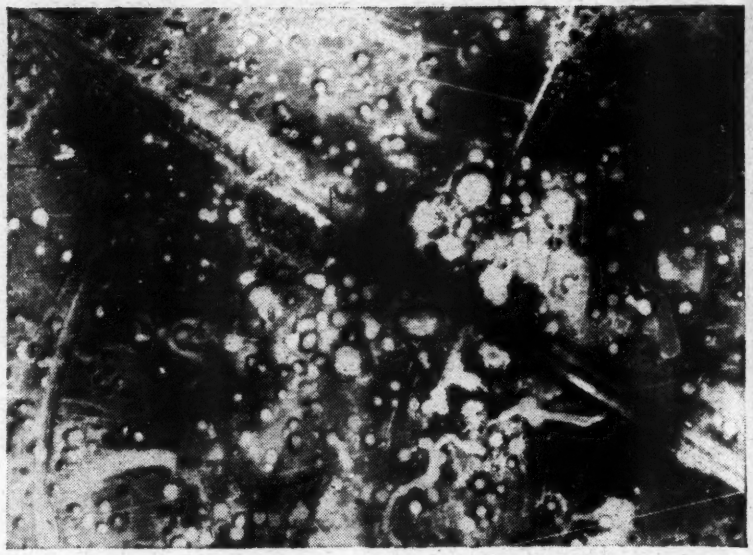
AFTER the depressing February, in which air activity was brought to a standstill for days at a time, thus allowing the Germans to move back in order, the fine weather of March has let loose the full fury of the Allied air power. On almost all sectors of the West Front the Germans have been withdrawing in haste towards the Rhine. Mechanical vehicles have moved at speed, and horse-drawn artillery has kept at the gallop. Up above this hurried procession the Tactical Air Forces have flown like Valkyries, choosers of the slain. When they appeared overhead the German drivers would often dive headlong for the nearest ditch, or whatever else seemed to offer a prospect of cover, leaving their vehicles to crash. The roads were lined with wreckage, as they were during the German retreat from Falaise.

The infantry could not escape by speed, and almost embarrassing numbers of them have surrendered. These surrenders reduce the strength of Rundstedt's forces just as much as the slaughter of the flying columns do, and they have now reached remarkable totals. Not long ago it was announced that since D-Day over a million prisoners had been taken, and the number has gone up substantially since then.

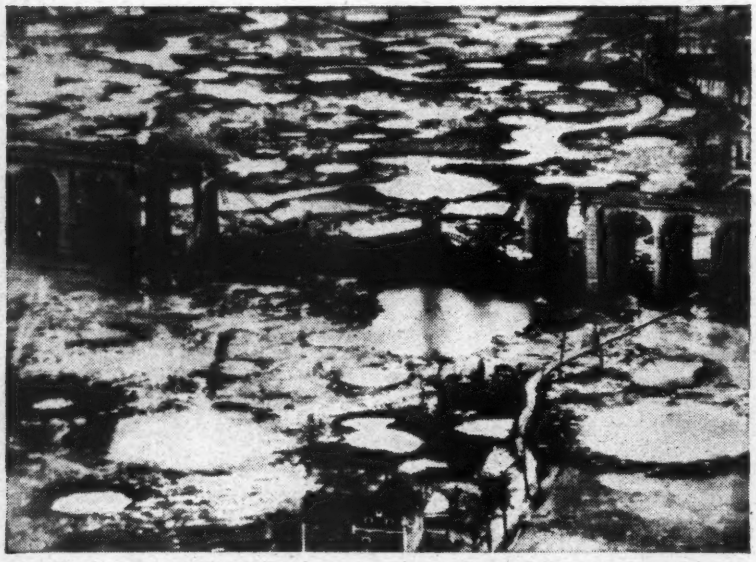
The squadrons of the U.S. 19th T.A.F. which had been sent to roam farther afield reported that they could find few targets on the west side of the Rhine. They thought that all the bridges had been blown up, and, if so, that means that the fleeing columns on the roads have not much to look forward to. The men who reach the banks of the river may contrive to get across by night, but the equipment will have to be left as booty for the Allies. So the pilots of the 19th T.A.F. flew on and destroyed aircraft on the ground near Frankfurt.

Heavy bombers of both Bomber Command and of the U.S. 8th Air Force also took advantage of the fine weather, and ranged far and wide. Of course, oil plants and benzol plants received special attention, as well as crucial points of communications. In addition, the bombers from Britain as well as those from Italy made a special set at airfields and bases where the German jet-propelled aircraft have their lairs. On one very fine day some 1,300 Liberators and Fortresses struck heavily at a particular group of airfields round Rheine. At the same time, the heavy bombers from Italy attacked a base for jet-propelled aircraft 50 miles to the north of Munich.

The Germans have evidently been hoping that the jet machines would do something to restore their lost position in the air. It is known that their speed



THE BIELEFELD VIADUCT: Picture taken after the attack with ten-ton bombs on March 14th. Many smaller bombs had been dropped previously, as shown by the many water-filled craters.



WHEN THE SMOKE CLEARED: A close-up of the Bielefeld Viaduct, taken on March 17th. Note the huge craters made by the ten-tonners, and the very effective destruction of several spans.

WAR IN THE AIR

has enabled the enemy to get a little more information about Allied dispositions and movements than he has been able to procure for some time past. So the Allies are dealing seriously with the enemy "squirts" (as the R.A.F. calls jet-propelled aircraft) and have been working on the principle that what you destroy on the ground will not be able to hurt you in the air.

On March 21st Mosquitoes raided Berlin for the thirtieth night in succession. London has endured more than that since the war began, but Londoners knew that it was going to happen, whereas Berliners believed Göring's promise that they would be safe from hostile air attacks. That must have made the shock harder to bear. In addition, the 4,000 lb. bombs now used are far more destructive than those used by the Germans in the big "blitz" of 1940-41. On the other hand, the Mosquitoes aim at military targets, and do not scatter their bombs broadcast over residential areas. As has been said (by Mr. Churchill, we believe), a bomb which kills only civilians is a good bomb wasted.

Rundstedt Sacked Again

SO poor old Marshal von Rundstedt has once more been deprived of his command on the West Front. It does not appear that he has made any gross mistakes in dealing with a very difficult situation. His offensive in the Ardennes never held any likelihood of a break-through which would drive the Allies back into the Channel, but it gained the Germans some time, and upset the programme of the Allies for their advance. But as the ultimate result was that we have been able to advance in fine spring weather under full air support, instead of in the winter, we probably gained as much as we lost. The Germans said that they wanted time; but they made no effective use of the time given them by the Ardennes offensive. That was not Rundstedt's fault. The fact is that Hitler hates him because he is a strong anti-Nazi.

Field Marshal Kesselring has succeeded Rundstedt. He is a *Luftwaffe* General, but in Italy he has shown himself a master of the difficult art of a fighting retreat. He might have done better at the time of our landing at Anzio if he could have had more help from his own Service; but all through the Italian campaign he has had to do the best he could without sufficient help from the air. He has shown his versatility by using the heights of the Apennines to compensate for his inferiority in air power. He will be no better off in that respect in his new command, and he has to conduct an intensely difficult retreat. The Rhine will not be an easy barrier for the Allies to cross. Their aircraft can fly across it as they will, and do immense damage on the eastern side.

RETURN TO CORREGIDOR: American paratroopers land near the spot which saw their heroic defence in 1942.

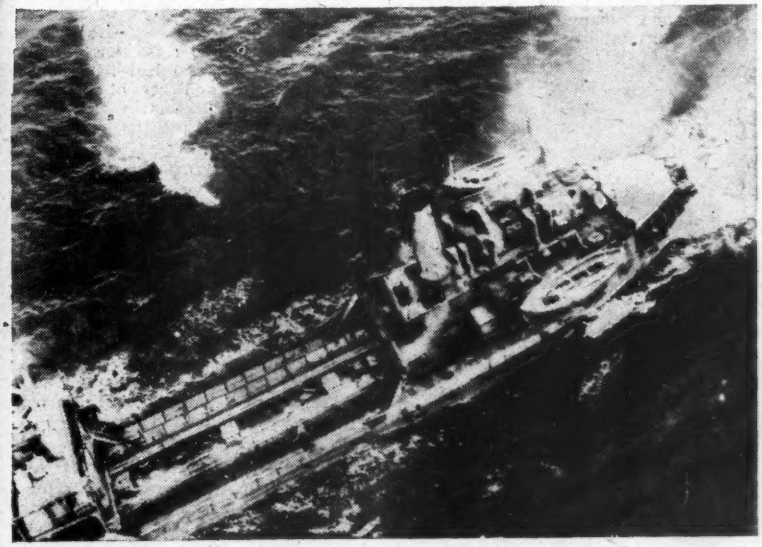
But sooner or later the infantry and armour must be got across, and it will tax all Kesselring's ingenuity to stop them. Something is brewing up in the northern end of the front, where Field Marshal Montgomery has set up the greatest smoke screen of the war, and Kesselring is not likely to have any idea of what is going on underneath it.

The East Front

THINGS are no brighter for the Germans on the East Front, where the Russians have methodically closed in on Königsberg and Danzig. They, too, have air superiority over the *Luftwaffe* and have been using it with energy and effect. The Red Generals have not made the mistake of being diverted from their strategic purpose by the tempting lure of Berlin. In due course, they well know, the Capital will fall into their mouths like a ripe plum.

Likewise in Silesia the Russians are pushing victoriously ahead and capturing German strongholds. They seldom make mention of their air arm in communiqués, but every now and then correspondents tell of its prowess.

A very dashing feat by the R.A.F. was the attack one morning on the Gestapo headquarters in Copenhagen. The buildings were suddenly and completely destroyed, and of the 500 Germans and quislings who were working there not many can have escaped. Unfortunately there were also 15 hostages inside, too, and their fate is uncertain.



THE SETTING OF A RISING SUN: A Japanese vessel attacked by American Liberators. Things have changed since Pearl Harbour.

HERE AND THERE

French Aircraft Production

M. CHARLES TILLON, the French Air Minister, in a speech at Cannes quoted by French radio, said that 2,000 aircraft would be produced in French factories this year.

Canadian Air Chief Retires

AIR MARSHAL L. S. BREADNER, A.O.C.-in-C. of the R.C.A.F. overseas since November, 1943, has retired and is to be succeeded by Air Vice-Marshal G. O. Johnson, formerly C.-in-C. Eastern Air Command.

King Visits Cotton Mills

WHEN the King and Queen made their recent Lancashire tour, one of the places they visited was the Dunlop cotton mill at Rochdale where they watched cloth being made for the anti-blackout suits worn by dive-bomber pilots.

Escapists

A GERMAN aircraft landed recently in Eastern Blekinge, according to a Swedish Defence Staff announcement, quoted by Swedish radio, Reuter reported.

There were two men and two women on board, who were taken into military custody.

High Promise

IN announcing the P-80 Lockheed "Shooting Star," jet plane, the *New York Herald Tribune* headed its note "Tops 700 m.p.h." and mentioned "a new type of wing with a knife-like leading edge and other aerodynamic innovations that master the problems encountered when the speed of sound is approached or surpassed."

The statement adds that the P-80 has the first pressurised cabin on a production-model fighter.

A Radial "Judy"?

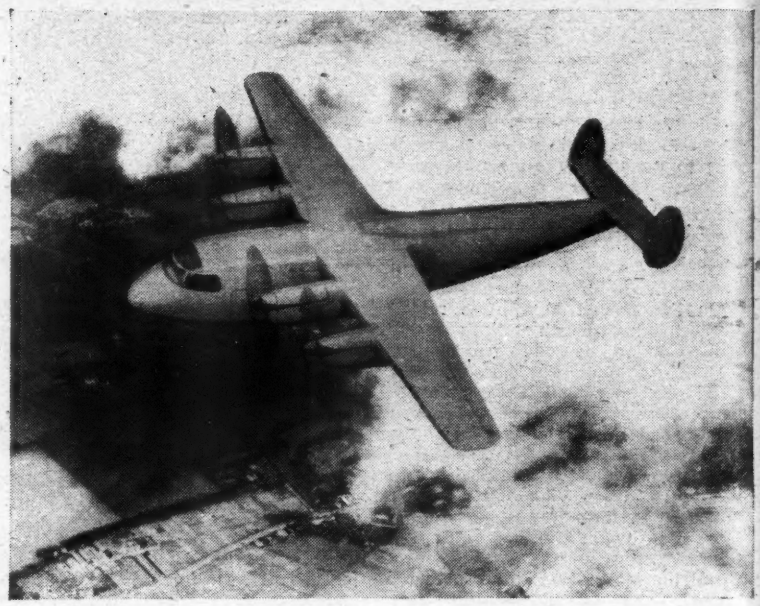
FROM the Pacific area comes news of a new type of Japanese dive-bomber which has been described as "resembling a radial-engined version of 'Judy.'"

The Judy II dive-bomber and Tony I fighter are, so far as is definitely known at present, the only two Jap aircraft to be powered by in-line, liquid-cooled engines—thought to be Jap versions of the Mercedes-Benz DB 603.

Distinguished Guests

SIR WILLIAM P. HILDRED, the D.G.C.A., and several other guests distinguished in civil aviation, have accepted the invitation to the "Gapan" annual dinner to be held at 4, Hamilton Place, W.1, on April 5th.

In view of the demand for tickets, those members of the Guild, and B.A.L.P.A., who wish to attend are asked to notify the Guild as quickly as possible, and in any case before April 3rd, giving the names of their guests, if any.

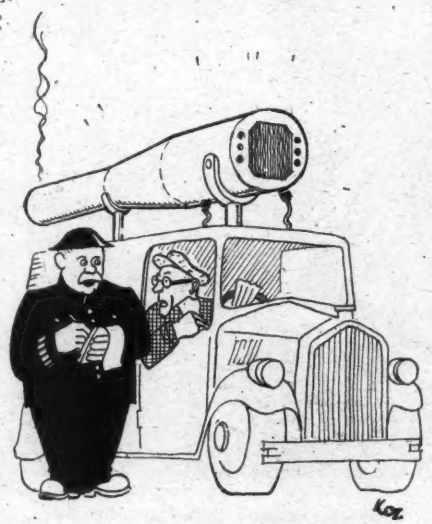


MILES MODEL: This photograph of a model of the Miles M.60 (four DH Gipsy Queens) superimposed on a landscape gives a realistic impression of the projected feeder-line aircraft which will accommodate 14 passengers and a crew of two.

Bendix Helicopter

A NEW design of Bendix helicopter recently illustrated by an artist's drawing in a U.S. periodical shows it to be of the two-rotor type with a fuselage shaped like a bullet.

It is said to be of 300 h.p. with a cruising speed of 120 m.p.h. and to seat four people, and "many exclusive features of control and stability" are claimed for it.



"Occupation?" "Salvage reclamation."

Written Off

SINCE Pearl Harbour, U.S. Army, Navy and Marine Corps pilots have destroyed more than 20,000 Japanese aircraft, according to a tabulation of official War and Navy Department reports released in Washington recently.

Effective Support

IN the nine months since D-Day, the R.A.F. Transport Support Group has flown about 35,000 passengers to the Continent and brought about 30,000 back to Great Britain. Additionally it has taken over more than 19,000 tons of freight and 950 tons of mail, and brought back to these shores over 600 tons of freight and 1,050 tons of mail.

Air crews who had baled out or force-landed and cases of compassionate leave are among its regular passengers.

Flying 'Frige

REFRIGERATED aircraft now carry 300 tons of meat every week from a recently completed cold storage depot at Calcutta to the men in Burma, many of whom thus enjoy imported frozen meat three times a week—and are thus nearly as well fed as Hun prisoners in G.B.!

When similar depots are completed at Madras and Bombay (they are now being built), the scheme will be extended to include every British soldier serving in India and Burma.

R.A.F. Men in South Africa

ANY R.A.F. personnel serving in South Africa who wish to remain there after the war would appear to be assured of the help of the Union's Government.

The Union Minister of the Interior, Mr. C. F. Clarkson, recently told the

HERE AND THERE

House of Assembly (in reply to a question) that the Government was prepared to consider any representations that might be made by the British Government for the discharge of R.A.F. personnel in the Union for this purpose.

Many members of H.M. Forces serving in Africa during the 1914-18 war and, indeed, the Boer War, subsequently made their homes in that country.

Air Council Change

AIR MARSHAL SIR JOHN SLESSOR is to succeed Air Marshal Sir Bertine Sutton as Member of the Air Council for Personnel. Sir Bertine relinquishes his appointment on passing to the retired list.

Since January, 1944, Sir John Slessor has been deputy to Gen. Ira C. Eaker, A.O.C.-in-C. Mediterranean Allied Air Forces, and in command of all R.A.F. units in the Mediterranean.

Underground Movement

A SPOKESMAN of the Japanese munitions industry is reported to have told the Jap diet that all Japanese aircraft factories must be moved quickly underground. Several have already gone underground, he added.

Doubtless the Superfort raids on such targets as the Mitsubishi plant at Nagoya are primarily responsible for this, but the news of our new 10-tonners should add weight to the argument.

Dog-fight Broadcasts for U.S.

INAUGURATION of a new United States wireless programme by which reports of air combat are broadcast after fighting aircraft have carried recording apparatus into battle, was announced last week by General H. H. Arnold.

"Combat wireless reporter teams will broadcast from every theatre where U.S. Air Forces are operating, bringing home to the listening public the sound and flavour of the airways, much as cameramen have translated it into pictures," the General said.

The programme is to be heard over the regular Blue Network every Saturday afternoon. Production will be under the direct supervision of Army Air Force Headquarters in Washington.

Ambitious Project

WITH commendable ambition, the Society of Model Aeronautical Engineers is launching a scheme to instal its own central headquarters with a research section and library for its ever-expanding membership, establish a national flying and training school, and also to acquire a travelling lecture and demonstration van to give illustrated talks to schools, colleges, clubs and institutes.

A national appeal is being made to raise £25,000 to put the scheme into operation, and is being supported by many leaders in aviation and the aircraft industry who knew full well the value of aeromodelling, both as an approach to the industry and for fostering air-mindedness.

That such men as Sir Frederick Handley Page, Sir Geoffrey de Havilland, Mr. F. G. Miles, Mr. L. G. Frise, Air Marshal Sir Philip Joubert, and Lord Brabazon should endorse the project ought to impress the general public with the national value of the project—readers of *Flight* will already appreciate it.

THE BIG NOISE: Designer of the 22,000 lb. bomb, Mr. B. N. Wallis, of Vickers-Armstrongs Ltd., snapped in a leisure moment with Mrs. Wallis at their Surrey home. Mr. Wallis recently broadcast to America.

Welcome Widows

THE Northrop P-61 night fighter, Black Widow, was, says a news story recently received from the Pacific, a particularly welcome arrival on the island of Saipan.

Before their arrival—the first flight arrived from Hawaii while the U.S. ground forces were grappling with the Jap occupants—the American troops were being given no chance to sleep at night because of constant bombing attacks.

The 5,271 miles from Hawaii were covered in a series of island hops in 27 hr. 10 min. flying time, in formation and without untoward incident.

The Missing M.P.s

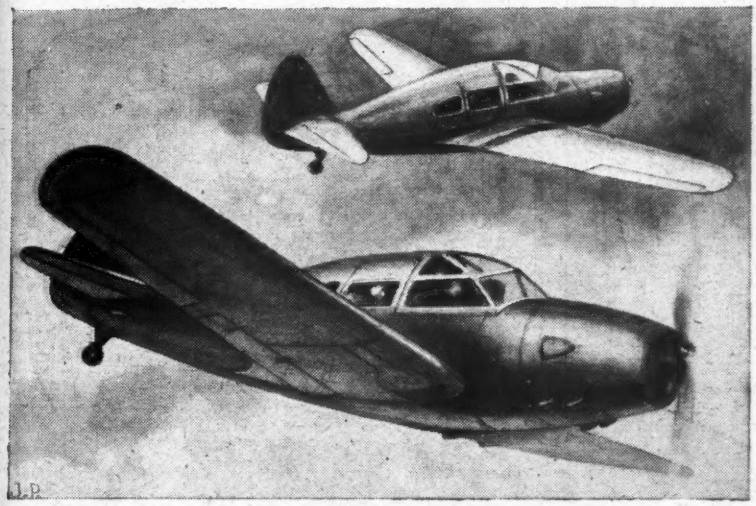
SIR ARCHIBALD SINCLAIR stated in the Commons last week that no trace had so far been found of Capt. Robert Bernays and Mr. J. Dermot Campbell, whose aircraft had been missing since January 23 in a flight from Rome to Brindisi.

The most likely cause of the accident appeared to be that the pilot had tried to press on instead of turning back in bad weather, as did the other pilot, and the machine crashed into the sea.

"We shall never know the pilot's side of the story," added the Air Minister, "and it would be very unfair to assume that he was to blame."

The C.-in-C. was not content to leave responsibility there and he considered the arrangements for the supervision of the flight should have been more strict. He had fixed responsibility and had taken action accordingly.

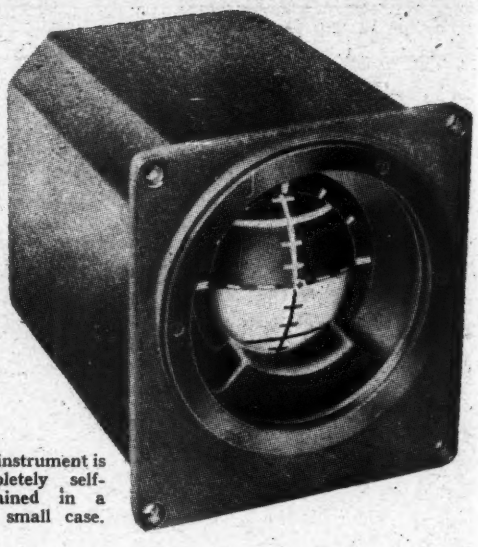
D



FAIRCHILD PROJECT: Designed for post-war owner-pilots, the Fairchild M-84 is a four-seater developed from the famous P-19 Cornell trainer, which it resembles in its main features, powered by a 175 h.p. 6-cyl. air-cooled inverted in-line engine. Slow landing and general ease of handling will be important characteristics.

Sperry Attitude Gyro

Unrestricted Artificial Horizon and Pitch Meridian : An Instrument Which Indicates Attitude at All Times



The instrument is completely self-contained in a neat small case.

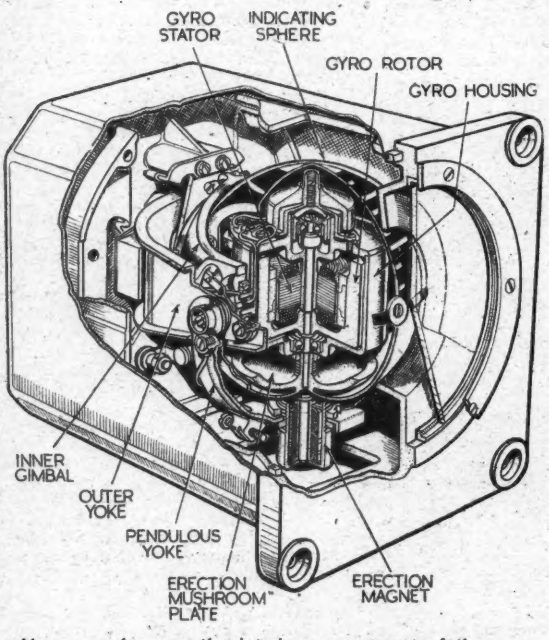
WHEN a pilot is flying blind, for example through cloud, and there is absolutely nothing he can see outside by which to orient himself, then in order to ascertain and maintain the attitude of his aircraft he is forced to fly "on instruments."

The six instruments which make up the standard British blind-flying panel are the air speed indicator, artificial horizon, rate of climb indicator, altimeter, directional gyro, and turn and bank indicator. These six indicators each perform a given function and by the correlation and interpretation of the several readings given, the pilot is able to tell what his aircraft is doing. However, there is a limiting factor to the ease of blind flying imposed by the necessity for interpreting and correlating the various readings, and although when flying blind normally the slight deviations in attitude are corrected immediately and almost subconsciously by a good "instrument" pilot, there always exists the possibility that at some time or other, in the violent viscera of cloud, for instance, the aircraft might be so thrown about that it would be a period of quite some few seconds before the pilot was able to straighten out his machine according to the readings vouchsafed by the instruments. Again, there is the possibility that in certain circumstances the aircraft might run out of height before the pilot had sorted out from his dials what was happening and had been able to apply the requisite correction.

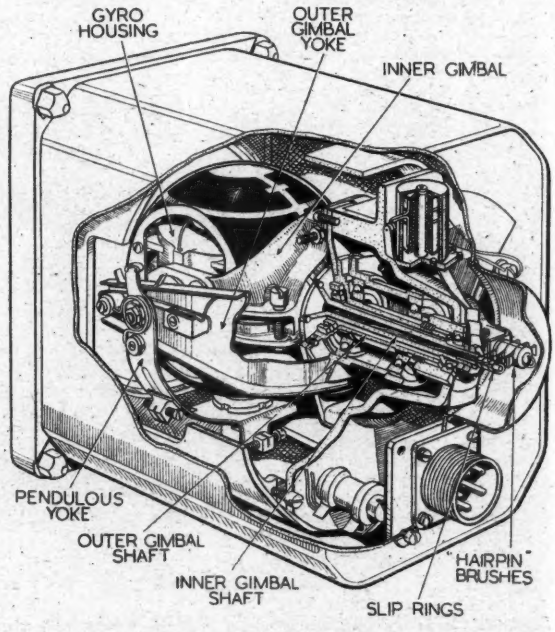
These circumstances are, of course, remote as to likelihood, but they are nevertheless possible and, furthermore, always ready to come forward and administer a salutary lesson to the but human pilot. Normally, it goes without saying, one can fly on instruments safely, accurately and happily—apart from the fatigue question—and never have a sticky moment; but there are definite limitations imposed by the complex readings of flight instruments, which prevent a pilot being able to tell—literally at a glance—what his aircraft is doing. An instrument which *will* tell the pilot at a glance exactly what his aircraft is doing is something for which we have been waiting ever since aircraft were first flown, and at last we have something which approaches it very closely.

Supersession of Artificial Horizon

The famous instrument concern, the Sperry Gyroscope Company, have devised a gyro-stabilised instrument which, without restriction of any kind, enables one to tell exactly in what position the aircraft is poised relative to the earth;



Above can be seen the interior arrangement of the gyro mechanism, erection mechanism and the relationship of gyro to sphere.



This view shows the co-axial arrangement of the inner and outer gimbal shafts together with the brush and slip ring assembly for power feed.

this having been achieved by virtue of surmounting an obstacle which, hitherto, has been one of the chief bugbears, that is, providing the gyro element with unrestricted 360 deg. movement in two planes perpendicular to each other.

It must not be thought that the new attitude gyro makes the normal flying instruments redundant. They are equally as necessary now as they ever have been, for it is only by their means that accurate blind flying can be achieved. However, the attitude gyro does supersede the normal artificial horizon owing to the fact that the range of indication is unrestricted as opposed to the approximate 60 deg. in pitch and 100 deg. in roll limits of the artificial horizon.

The attitude gyro is a departure from normal practice in two respects, (i) in its unrestricted movement, and (ii) in that the indication given is of pattern form as distinct from the "pointer and line" form in general use.

Representation

Through a circular window in the instrument case the pilot sees a portion of a sphere, the upper half of which is dark in colour whilst the lower half is light. Across the centre of the window is an alternately light and dark dotted lubber line which appears to the pilot as being in line with the sphere's equator when in level flight. In the centre of the lubber line is a circular "bull's-eye" which is used as a pitch index in steep turns or rolls.

A meridian line passing through both polar positions bisects the sphere vertically, and at right angles to it latitude circles are spaced at each 30 deg. above and below the equator with short horizontal lines across the meridian at each 10 deg. between the latitude circles. The 90 deg. references are solid circles at each end of the polar axis. All these markings are in contrasting colour to the hemisphere on which they lie so that it is equally as easy to read one half of the sphere as the other; additionally, the pattern appears the same under ultraviolet fluorescent lighting by night as it does by natural daylight.

Around the upper half of the window frame are marked radial reference lines at each 30 degs. Thus, in a 30 deg. bank to port, for example, the equator and meridian line of the sphere will each bisect the lubber line's central bull's-eye, but the upper limit of the meridian will be aligned with the 30 deg. division to the right on the window frame, whilst the left extremity of the equator will be lined-up with the 60 deg. division on the left of the window frame. The accompanying diagrams illustrate a series of indications and pilot's views for various manœuvres.

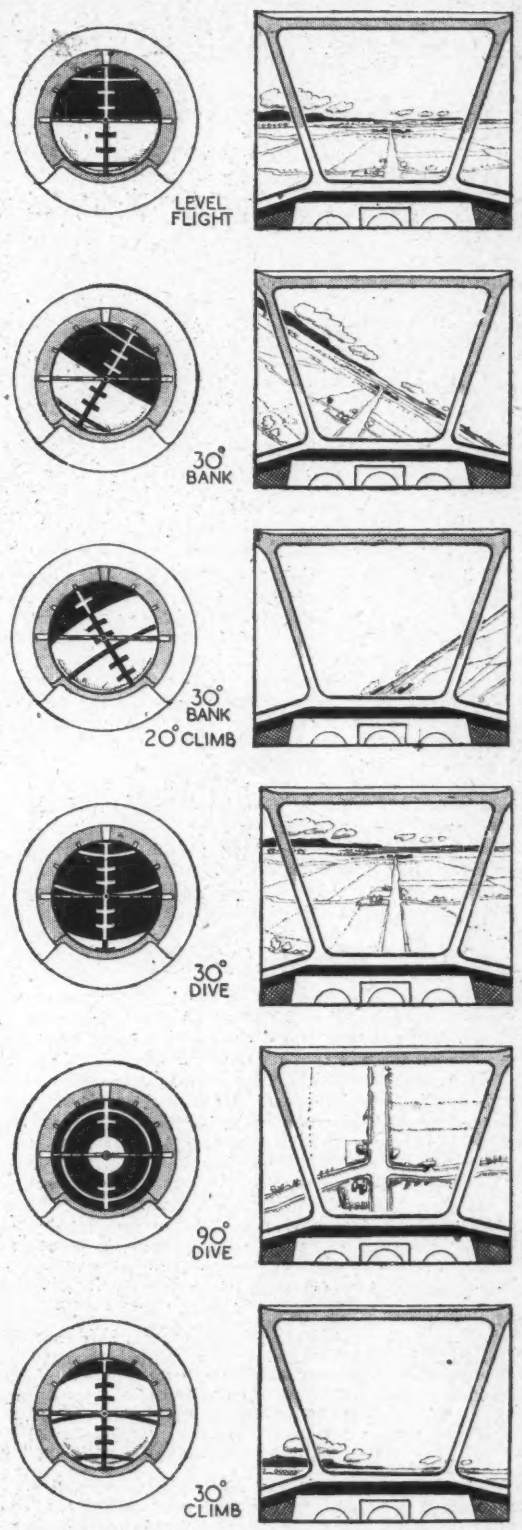
Construction of the attitude gyro is neat and compact, the whole being enclosed within a case 5in. square by 7⅞in. long and weighing but 4¼ lb.

Structure

The gyro unit comprises the rotor (squirrel-cage) of a three-phase induction motor which spins around the stator on bearings at top and bottom of the enclosing housing. Around the housing is fitted the indicating sphere, the sides of which are cut away to accommodate the bearings in which the gyro housing is pivoted. These bearings are carried in the horn tips of the inner gimbal yoke which itself is mounted on the end of a shaft running in bearings at the rear of the instrument case, thus the indicating sphere can rotate through 360 deg. about the transverse axis and the gimbal yoke supporting the sphere can rotate through 360 deg. about the fore and aft axis. By this means unrestricted movement of the sphere in two planes perpendicular to each other is achieved.

Electrical current is supplied to the gyro by three "hairpin" contacts which act as brushes to three slip rings on the end of the inner gimbal shaft. Leads from slip rings to rotor are carried along inside the shaft and branch to each arm of the gimbal yoke to effect contact at the bearings.

Beneath the rotor housing, yet within the sphere, is an "inverted mushroom" spherical segment erection plate mounted on an extension of the rotor shaft and spinning with it. Immediately beneath the erection plate and sup-



These views correlate to the reader the indications given by the instrument together with the view as seen by the pilot for several conditions of aircraft attitude. It will be seen that the representation is not natural in roll or level flight although in pitch its pattern makes it so.

SPERRY ATTITUDE GYRO

ported in a U-bracket swung from the outer gimbal yoke is the erection magnet, this, of course being outside the indicating sphere.

The outer gimbal yoke is supported in two ball-bearings co-axial about the inner gimbal shaft and has limited swing to 23 deg. either side about the fore and aft axis. Likewise the U-bracket carrying the erection magnet can swing 30 deg. back and forth in its bearings on the transverse axis. It may thus be seen that the erection magnet can swing within limits about both the roll and pitch axes, but as it is pendulous it always seeks the vertical unless accelerated in the horizontal plane; for example, during a turn.

Bearing friction and slight unbalance, neither of which can be completely eliminated, impose on the gyro forces which tend to make the spin axis deviate from the vertical. Additionally, since a gyro maintains a fixed attitude in space it appears to drift relative to the earth. It is, therefore, to overcome the effect of these three factors that the erection system is incorporated, its function being to maintain the gyro axis vertical in order to establish a fiducial flight reference.

Erection Mechanism

The erection plate, as stated, spins with the gyro rotor and is suspended over the pendulous erection magnet which always (normally) seeks the vertical. Magnetic flux emanating from the magnet induces electro-motive forces in the body of the rotating erection plate, and, consequently, eddy currents and a magnetic field, but as this is symmetrical and the erection plate is normally rotating on an axis on which the magnet is suspended, the magnetic forces can be considered as in a state of balance. However, when the plate is displaced relative to the magnet, the flux emanation from the latter is no longer symmetrical about the plate. This displacement breaks down the state of balance in the induced electro-motive forces which causes a drag to be produced on the erection plate tending to return it to the symmetrical (co-axial) disposition once more. In such a manner the erection system governs the gyro by overcoming the forces which cause the gyro to drift.

Instrument Presentation

There is a fairly full field of endeavour waiting to be explored on the subject of flight instrument representation.

The writer remembers thinking when he first came across the artificial horizon that it seemed a pity that the instrument horizon bar moved against a stationary aircraft lubber image instead of vice versa. Of course, reversed presentation means added complication in design and construction of the instrument. There is, too, the consideration that pilots are familiar with one type of presentation and they would need to forget what they had learned in order to cope with reversed indication. In the writer's opinion, however, the reversed presentation is intrinsically the better and would be found easier to fly on with greater accuracy because the sensing of the indications would be natural.

Pilot's Conservatism

Other factors enter into the general problem, and one of these, which, perhaps, is sometimes overlooked, is the tendency of many pilots to fly largely by one, or possibly, two instruments. One is taught to fly on instruments with the precept that the various readings should be correlated, and the aircraft should be flown on the interpretation of the correlated readings. What in fact actually happens is that a pilot finds that he can fly fairly reliably on the artificial horizon and directional gyro, or on the turn and bank indicator and d.g. and, of course, he does so. It should not be imagined that all pilots react in this way, for such is not the case; but there are, nevertheless, many pilots who do fall into this category. Probably the chief danger of concentration on perhaps two instruments to the exclusion of the other four is that when something sticky does happen, the pilot takes some little while before he can sort out from his clocks what the aircraft is doing—were he normally to fly by *all* his instruments, that sorting out period might be drastically reduced—and the time factor for corrective action can easily be vital; that is, vital to life.

Pictures to Reduce Fatigue

This problem of instrumentation might be simplified by arranging that each instrument shows the pilot a pictorial representation the sense of which is natural. Were this done effectively the pilot's reaction to any given indication would be naturally instinctive, automatic and virtually instantaneous. The attitude gyro is a good attempt at pictorial representation apart from its quality as a flight instrument but, nevertheless, the sensing of the indications given is not natural, it is but an elaboration of the normal artificial horizon. The whole business of instrument flying is complex and difficult of analysis. Certainly, however, with the post-war airlines giving night sleeper services and sub-stratosphere routes there must be a drastic simplification of instrument presentation. Fatigue is a deadly foe of the pilot, and instruments get proportionally more difficult to interpret with increase in fatigue.

It seems clear that the goal to be aimed at is graphic pictorial representation which eliminates the necessity for interpretation.

BODY SNATCHING

THE idea of being whipped smartly off the ground at the end of a nylon rope trailed by a low-flying aircraft may not strike everyone as the ideal way of boarding the said aircraft, but the exigencies of war often impose upon the individual some degree of physical (and/or mental) discomfort in the interests of operational efficiency.

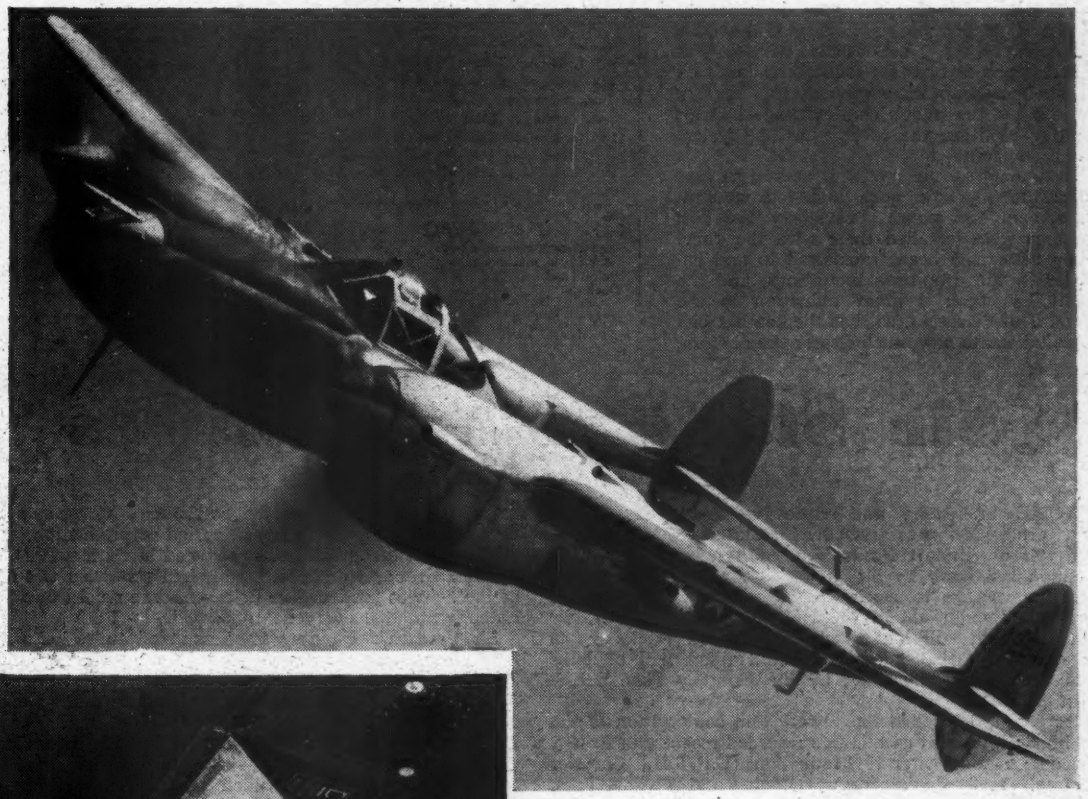
Patently there can be occasions—such as the retrieving of an agent from hostile territory, or an airman stranded inaccessibly—when an aircraft wishes to collect a passenger in circumstances which make a landing inadvisable or even impossible, and it was with this thought in mind that the U.S.A.A.F. decided to explore the possibilities of applying the pick-up method already proved to be quite practical with mail bags and even laden gliders.

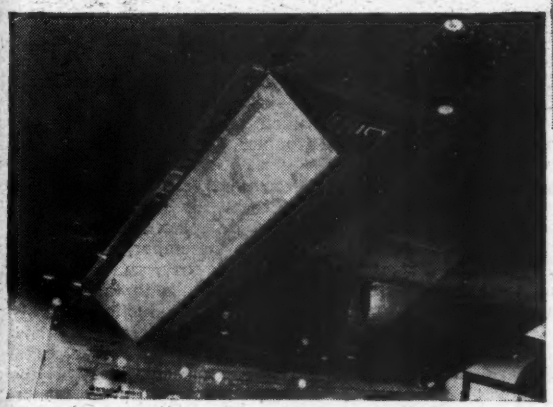
Experiments were therefore undertaken by the U.S. Air Technical Service Command, all their tests being made at the Clinton Country Army Air Base in Wilmington, Ohio, which is actually a glider field. In the first test a Stinson Reliant was used, and its pick-up equipment differed only in small details from the normal pick-up gear. An electric winch with automatic delayed-action brakes accommodated 185ft. of half-inch nylon rope, the business end of which carried a hook and was attached to a 10ft. wooden guide pole trailed beneath the aircraft. Total weight of this gear was 2,000 lb. The ground equipment comprised a nylon loop hung between two poles and attached to the "guinea-pig's" special harness. Considerable time, incidentally, was spent on evolving a suitable modification of normal parachute harness and sundry other details, in order to ensure a good safety factor. Nevertheless it was as well that they tried it out on a sheep before risking a human passenger, because the first sheep was killed when the harness twisted and strangled it. Further modification, however, overcame this defect and the next sheep—an easy animal to kill—lived to "baa" the tale.

But this in no way detracts from the cool courage of Paratrooper 1st Lt. Alexis Doster, who volunteered to be the first human passenger to be picked up, for the risk was still pretty great. In fact, Doster wore a parachute and carried a sharp hunting knife to cut himself free if there proved to be any serious trouble about the final operation of getting him safely into the aircraft. He reported, in fact, that his harness and the "prop wash" did make it difficult, but said that the actual pick-up was perfectly smooth and quite free from any jerking effect. Experiments are continuing.

P–38L Lightning

Lockheed Designation 422 : U.S. Army Designation P–38L (Fighter) and F–5E (Photo Reconnaissance)





"ON TO TOKIO": The latest model of the Lightning, the P-38L, has many improvements, including anti-buffeting flaps (left) and hydraulic aileron servo.

THE first of the Lockheed Lightnings took off from March Field on January 27th, 1939. Since that time a never-ending research and development programme has resulted in a succession of variants of the original machine, and the tasks for which it has been successfully employed have included fighting, intercepting, ground-strafing, dive bombing, reconnaissance, photography, laying smoke screens, long-range bomber escort, rocket-firing, low-level skip-bombing, tank-busting, torpedo dropping, and towing troop and cargo gliders.

In the model L, the subject of the heading illustration, the Lightning has reached its 18th version. Known as the "On to Tokio," this version is the most formidable of the series so far, but it would be rash to assume that no further development is possible. Changes and improvements of various sorts have resulted in a speed increase of 6 per cent., and it is claimed that the top speed is in excess of 425 m.p.h. Range has been increased by installation of fuel tanks within the wings, and its range of 1,700 to 1,800 miles enabled it to be the first type to land in the invasion of Leyte and Luzon in the Philippines. By the addition of drop tanks the maximum range is increased to more than 3,000 miles. The rate of climb has been improved by new superchargers on the Allison engines. As a twin-engined fighter-bomber the model L can carry a bomb load of 4,000 lb. Its normal loaded weight is 18,000 lb., but it can be operated at an overload weight of 21,400 lb. The wing loading is then in excess of 65 lb./sq. ft.! The stalling speed figure of 75 m.p.h. quoted by the makers may be assumed to refer to conditions of a much lower weight, such as would obtain on the return from an operation, with all the bomb load discharged and much of the fuel consumed.

Anti-Buffet Flaps

Among the new features of the model L may be mentioned the dive flaps and the "boosters" incorporated in the aileron controls. Both may be said to have been necessitated by the high speeds that may be attained, particularly in a dive. The flaps are of an unusual type, as shown in the photograph. Trouble was encountered in earlier models due to turbulence at high speeds. The

THE P-38L

new flaps, formed somewhat like a book, have been found to reduce the buffeting of wings and tail previously met. When retracted they do not, of course, detract from the speed in normal flight. The aileron boosters are hydraulically operated and are so designed that while relieving the pilot of the really heavy loads on the stick, they still enable him to retain the "feel" of the controls. Put differently, the boosters reduce the loads on the stick to approximately one-sixth. Further to increase the pilot's comfort and thus his fighting abilities, the cockpit-heating system has been extended.

Armament of the model L comprises four 50-calibre machine guns and one 20-mm. cannon in the nose. Previously the gun cameras were installed there with the guns. They have now been transferred to and enclosed in the drop-tank mountings, and the result has been a great reduction in the amount of vibration, so that the combat pictures taken are now much clearer than before.

DIMENSIONS

Span	52ft.
Length Overall	37ft. 9⅝in.
Height Overall	9ft. 10½in.
Wing Area	327.5 sq. ft.
Aileron Area	24.4 sq. ft.
Fin Area	27.4 sq. ft.
Rudder Area	21.4 sq. ft.
Tailplane Area	24.0 sq. ft.
Elevator Area	24.5 sq. ft.

POWER PLANT

Two 1,500 h.p. Allison V-1710-F30 liquid cooled in-line engines with turbo-superchargers.

Power Loading: 6.1 lbs. per h.p.

11ft. 6in. diameter Curtiss constant speed, full feathering, three-bladed airscrews.

ARMAMENT

One 20-mm. cannon in nose
Four 50-cal. machine guns

Bomb Load	4,000 lb.
Rockets	Optional

PERFORMANCE

Range	1,700 to 1,600 miles (over 3,000 miles with auxiliary fuel tanks).
Service Ceiling:	Over 40,000 ft.
High Speed:	Over 425 m.p.h.
Stalling Speed:	75 m.p.h.
Terminal Velocity:	Over 575 m.p.h. (without brakes).

LANDING GEAR

Type	Tricycle, retractable
Tread	198in.
Wheel Size	Main 36in.; Nose 27in.
Brakes	Goodyear hydraulic

WEIGHTS

Weight Empty:	12,700 lb.
Gross Weight:	18,000 lb.
Maximum Overloaded Weight:	21,400 lb.
Normal Wing Loading:	48 lb. per sq. ft.

Sir Stafford Statistitises

Warm Tribute Paid to the Halifax Group

SOME interesting and impressive figures of wartime production were given by Sir Stafford Cripps, Minister of Aircraft Production, at a luncheon given in London last week by Sir Frederick Handley Page. The occasion was, so to speak, the swan song of the Halifax Group, although not of the Halifax bomber, which, Sir Stafford said, still had much useful work to do. The assumption is that henceforth the Halifax will be built mainly, if not exclusively, by the Handley Page parent firm.

Sir Stafford recalled the history and composition of the Halifax Group, but as this was recorded recently in *Flight*, when London Aircraft Production (L.P.T.B., Chrysler Motors, Duple Bodies, Express Motor and Body Works, and Park Royal Coachworks) gave a party, it need not be repeated here. He gave some statistics, however, which have not previously been released. The Halifax was designed in 1938-39; the prototype made its first flight in October, 1939, and production began early in 1941.

Bombs Gone!

Halifax bombers have, Sir Stafford said, dropped more than 200,000 tons of bombs. At the peak of production the Halifax Group (which comprised, in addition to L.A.P., the English Electric Co., Rootes Securities and the Fairey Aviation Co.) comprised 41 factories with a floor space of 7½ million sq. ft.; 600 sub-contractors; and 51,000 employees. At that time the Group produced one complete aircraft every hour. What that meant might be realised from the fact that there were 254,000 airframe parts made, fitted and inspected every hour; 2,000 embodiment loan parts were received, inspected and fitted every hour; the amount of light alloy sheet cut, formed and fitted per hour represented two-thirds of an acre and weighed 7 tons; the amount of sheet metal rolled or drawn into sections every hour amounted to three miles; in addition special light-alloy extruded sections cut, drilled and fitted amounted to 5 miles; the number of rivets closed per hour was from 600,000 to 700,000; electric cables represented three to four miles; and pipes fitted per hour numbered 1,045, or something like one mile. The peak period of production, early in 1944, saw 1,200 Halifaxes produced in six months. The Halifax Group, Sir Stafford said, had produced two-fifths of the heavies produced in Britain, a fine record on which he congratulated everyone concerned.

Sir Frederick Handley Page thanked those who had helped him to make this vast production possible, especially Sir George Nelson (English Electric), Lord Ashfield (L.P.T.B.), Sir William Rootes and his brother Reggie, and Major Maurice Wright and Mr. Chichester-Smith, of the Fairey Aviation Co. He referred humorously to incorrect drawings, parts not in accordance with drawings, modifications and similar troubles which beset anyone building aircraft. But in spite of all troubles, the Halifax Group had been a happy family.

As an instance of the difference between bombers of this war and those of the first world war, Sir Frederick recalled that the order for the first o/400 was placed in December, 1914. The first machine flew in December, 1915. The V/1500 was conceived in September, 1917, and was flying in April, 1918. He expressed his thanks to those in his own firm who had helped with Halifax production, notably Messrs. Hamilton, Smith, Robinson, Volkert, MacRostie and Ratcliffe. Sir Frederick then presented silver model replicas of the Halifax to the representatives of the "daughter firms," and parchment scrolls to a representative of the workmen of each firm.

Happy Association

In reply, speeches were made by Sir George Nelson, Lord Ashfield and Sir William Rootes. All expressed their gratitude for the help they had received from the parent firm, and the pride with which they looked back on what had been a very happy association. Sir William Rootes said his firm, the Rootes Group, was going back to manufacturing motor transport, but he did not exclude the possibility that at some later date he might re-enter the aircraft field.

A product of

RUMBOLD

THE SPECIALISTS IN

COMFORT ENGINEERING

L. A. RUMBOLD & CO., LTD., KILBURN, N.W.6

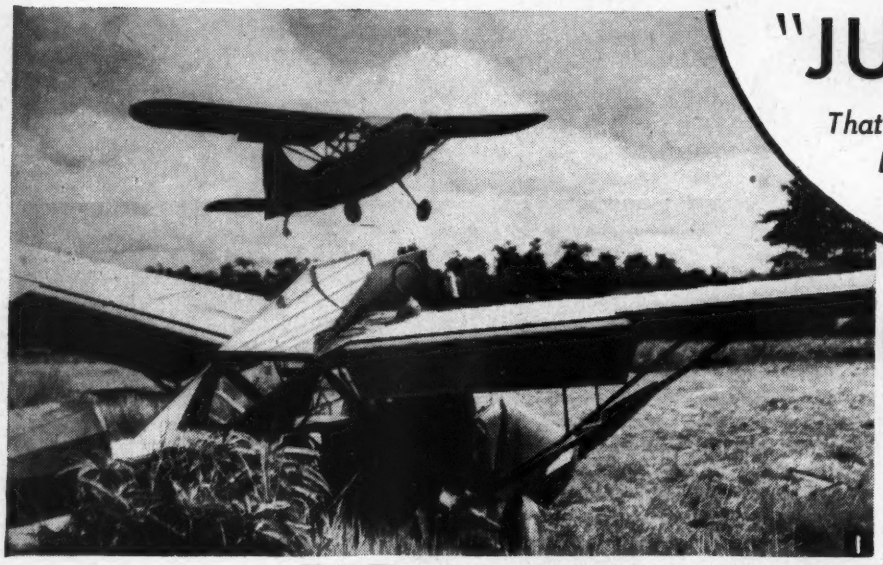
Telephone : Maida Vale 7366-7-8

The furniture
of the
AVRO YORK
ENDEAVOUR
was designed
and manufactured
by
RUMBOLD

E

"JUNGLE AN

That's the Nickname a Wounded
Liaison Squadrons of Eastern
Stinson Sentinels and
Operating in



1 A Sentinel takes off from a forward airstrip ; in the foreground stands a damaged "angel" which has itself become a casualty.

2 Some "walking cases" about to embark for evacuation from an advanced airfield just behind the lines.

3 Raising a cloud of dust with its slipstream as it gathers speed over the rough ground, an L-5 Stinson begins its short take-off run.

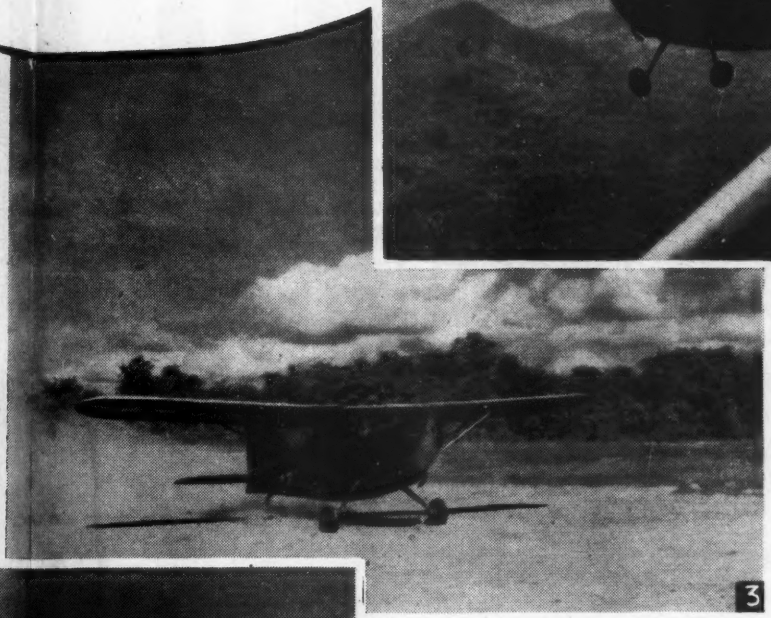
5 A casualty being carried by East African s centre on arrival from the fighting line at

6 Casualties being taken from the aircraft o station, from which they will later be

7 A Stinson ambulance waits on a forwa bearers bring out the wounded for evacua wounded men have been saved by t

ANGELS"

Wounded G.I. Bestowed on the
f Eastern Air Command:
tinels and Piper Cubs
ting in Burma



4 Two's company on the return flight with wounded over the inhospitable Burmese jungle, but the Stinson's 175 h.p. "flat-six" Lycoming engine can be trusted.

FLYING out daily to forward areas in the jungles of Burma, the Stinson Sentinels and Piper Cubs of Maj. Gen. George E. Stratemeyer's Allied Eastern Air Command carry out a varied list of assignments including that of bringing wounded and sick men away from the front. It was, in fact, a wounded American soldier evacuated safely by one of the sergeant-pilots of these sturdy, adaptable little aircraft who nicknamed them "jungle angels."

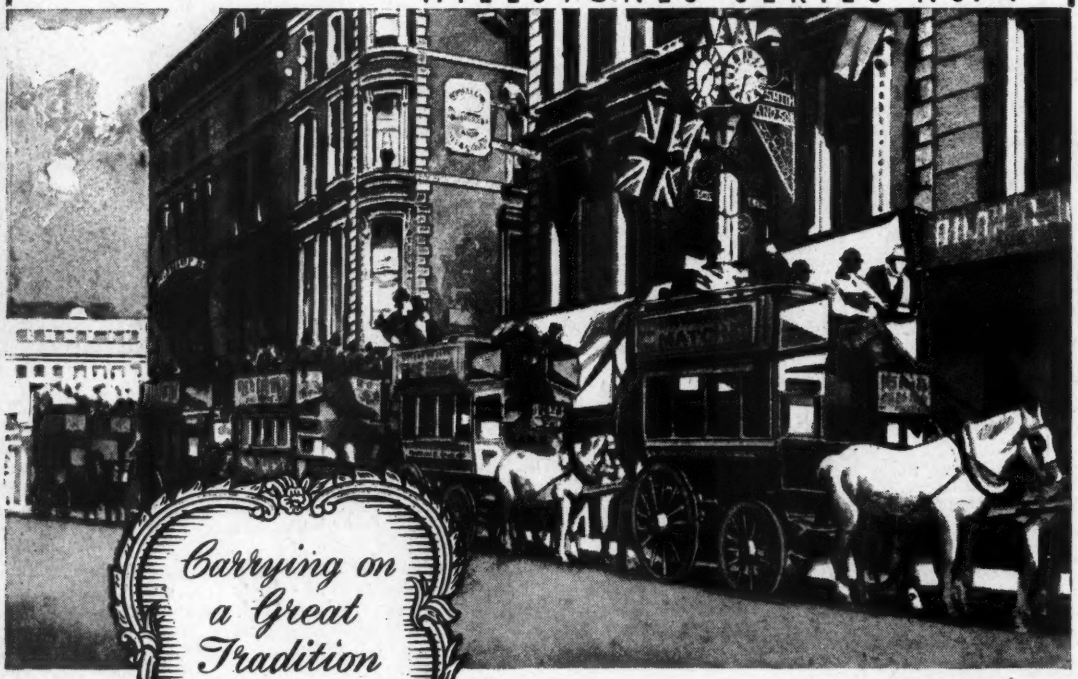
On their outward trips they carry food, mail, blood plasma, messages, ammunition and medical supplies, landing on and taking off from hastily cut, rough airstrips. They also act as artillery spotters, observe enemy troop movements, and transport staff officers and technicians between the bases and the front line.

Often they have to fly at night, navigating to some little airstrip hidden among the mountains when Jeep headlights provide the "flare path," and recently two Cubs flew mechanics out to a crash-landed P-47 in a rice field and salvaged $15,000 worth of its equipment—guns, instruments and radio.

East African stretcher-bearers to the reception
ghting line at the casualty clearing station.
the aircraft on arrival at the casualty clearing
will later be taken to a base hospital.
on a forward airstrip while the stretcher-
for evacuation. The lives of many badly
en saved by these "jungle angels"

Smiths of England

MILESTONES SERIES No. 1



Carrying on a Great Tradition

The premises occupied by the firm for many years at No. 9 Strand

The ploughshares of the farmer, the weapons of the warrior, the tools of the worker have been forged for England through the centuries by those skilled and patient craftsmen, her Smiths. Blacksmiths and Goldsmiths, Tinsmiths and Coppersmiths . . . all have won honour for the name they have given to this great family of Smiths. How fitting it is that a Smith should have set up a business of working in metals which has brought new and world-wide prestige to this same name! In 1851, when it was thought that the birth of a new era of Peace was being heralded by the Great Exhibition in Hyde Park, a Mr. Smith opened his shop in Newington Causeway, London, for the making and selling of fine English watches. Later his son started a similar shop at No. 9 the Strand. He was afterwards joined by his son, now Sir Allan Gordon-Smith, who today is Managing Director of the important group of precision manufacturers in metal listed below.

S. SMITH & SONS (ENGLAND) LTD

MOTOR: Smiths Motor Accessories Ltd., K.L.G. Sparking Plugs Ltd., British Jaeger Instruments Ltd., Smiths Jacking Systems Ltd. CLOCKS & WATCHES: Smiths English Clocks Ltd., Enfield Clock Co. (London) Ltd., English Clock Systems Ltd., A.B.E.C. Ltd., British Precision Springs Ltd. AIRCRAFT & MARINE: Smiths Aircraft Instruments Ltd., Henry Hughes & Sons Ltd., Marine Instruments Ltd., Furzehill Laboratories Ltd. INDUSTRIAL: Smiths Industrial Instruments Ltd., A.T. Instruments Ltd.

Scientific S.E.1T

Air-age Education

The Need for Realism in Short- and Long-term Planning

By CAPT. K. J. G. BARTLETT

IT is refreshing to read an article like "Air-age Education" by Mr. Gruberg (*Flight*, January 18th, 1945), because it shows that a more realistic approach to civil aviation than was the case even a few months ago is beginning to assert itself. Too long has the idea prevailed that air transport is something for cranks to play with, but of no importance to a serious industrialist.

In his interesting contribution Mr. Gruberg rightly points out that a new attitude to geography is vitally necessary. The Georgian and Victorian version of this science, "a description of the world and its inhabitants" with its political map based only on man-made frontiers, with mountains shown incidentally as "caterpillars crawling uncertainly about the face of the map," inevitably gave place to a more enlightened teaching which tried to proceed from effect to cause and to investigate natural and political factors which were responsible for the world as it was seen at the time.

However, even this revised geography had the drawback of insularity. In the "Air Age"—and I suggest that we need to be wary of this newly coined definition which, virtually, means nothing but "future," pure and simple—geography, in order to conform to the political consciousness of the day, has to undergo a further transformation and give an all-round, unobstructed view of the globe—as opposed to the flat, and consequently distorted map—as one inseparable whole, doing away with such picturesque but harmful expressions as "the ends of the earth" or "the four corners of the world," which were largely responsible for the insular outlook of the past generations.

Aeronautical Over-education

So far so good, but when Mr. Gruberg continues a nation-wide programme of aeronautical education, does he not make a dangerous over-statement of the case which may discredit the efforts of those who seek to bring home to industry at large the significance of commercial aircraft to Britain in her struggle for a fair share of the world trade? Mr. Gruberg wants a school curriculum which, amongst other things, would embrace the "construction of aircraft models from the toy to the realistic, true-to-scale models and the study of aerodynamic properties." Admittedly, he anticipates opposition and makes his imaginary critic retort that "there is no need for everyone to become an aviator," which perfectly sound statement he counters by asking: "Does the teaching of geography or Scripture necessarily induce all pupils to become explorers or parsons?"

Personally, I find myself readily lining up with this imaginary critic. It is true that we cannot—nor want to—all become explorers or parsons, but as we are members of a social system, we necessarily have to know and assimilate, not in a scholarly but in a practical manner, the tenets of our creed to guide our conduct. As to a general knowledge of geography, we should not even be able to listen to a news bulletin or read a war communiqué intelligently without it, but the position is radically different when we turn to applied science. After all, we do not require to know Morse to send a cable as long as the operators of the cable company know it. How many schools of the mid-nineteenth century taught their pupils to make model locomotives? Very few, I imagine, and yet our grandparents used and developed the railway most successfully.

To me Mr. Gruberg's argument seems to come remarkably close to that plea for "air-mindedness" which sometimes can only be interpreted to appear to mean that everyone must be able to recognise every type of aircraft and must strive to join a flying club.

"The butcher, the baker, the candle-stick maker" must be intelligent citizens so that they may use their votes for the betterment of the community, and this certainly entails appreciation of many things which could safely be ignored a hundred years ago. They must understand that we cannot dispense with the commercial aircraft, but need not know how it is built and why it can fly.

Air Commerce

Mr. Gruberg gets to the roots of the problem when he writes, "business men, manufacturers, engineers and salesmen will have to realise that air transport gives them exceptional opportunity of intimate contact between producer and consumer"—in other words, that air transport is transport not aeronautics, commerce not politics. That is the crux of the matter and it is, therefore, unfortunate that it is dismissed somewhat briefly in the article. The education of those who will be doing our export trade must begin *now* so that they see what advantages the air carriage of their goods or buyers or salesmen offers them, what fatal disadvantage they will be at if they seek to trade in the post-war world without availing themselves of its modern facilities. The inculcation of intelligent understanding of the air through the medium of schools is certainly an urgent matter and is sound long-term planning, but it will be to no purpose if we neglect the short-term plan of the rehabilitation of our export trade. By this it is not suggested that air transport will supersede any of the older means of transport, but, to quote our own example, the statistical research undertaken by the Bristol Aeroplane Company before it decided to construct the Bristol "Freighter" showed beyond shadow of doubt that aircraft are an indispensable vehicle of trade, that certain markets will be won or lost in measure with industry's understanding and use of air transport.

To-day, as before the war, the greatest problem of the British aircraft industry is lack of appreciation of the economic possibilities of its products. This was stated forcefully as long ago as 1923 by one of the most far-sighted men ever responsible for British air transport, the late Major General Sir Sefton Brancker; "Here again we meet the necessity of educating the public. We are ruled by the voice of the majority, and no Government will face the responsibility of spending large sums on an enterprise like air transport unless it has the people behind it—and so we must leave no stone unturned to teach the public what aviation means to this country, and so get them to say that they must have it—cost what it may."

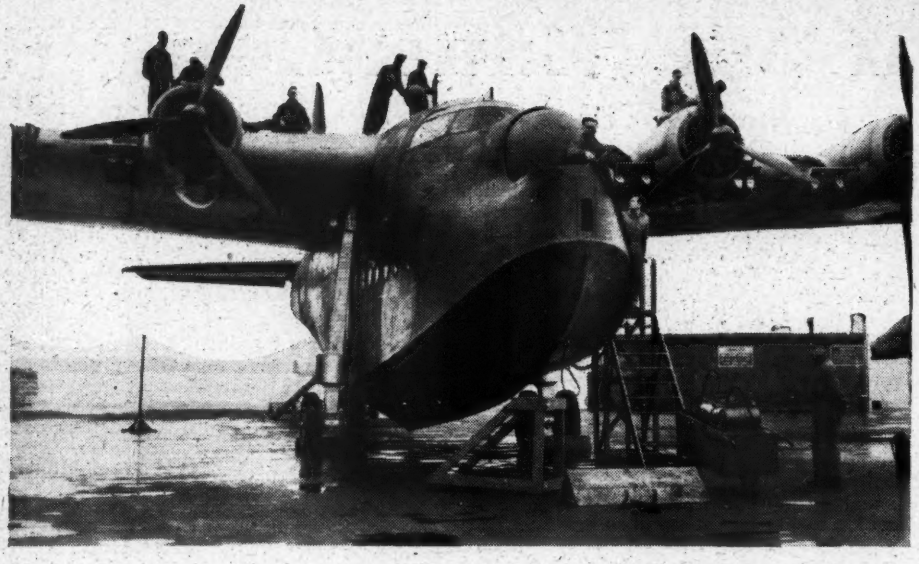
British industry needs to recapture some of that spirit of enterprise which built the Empire, not, as seems to have been the tendency of late, to rely entirely upon the central Government to guide, provide and subsidise.

It is the duty of the airlines, commercial aircraft constructors, and commercial and aeronautical writers to present fairly to commerce the true economic function of air transport.

AERONAUTICAL "CHAIR" FOR BRISTOL VARSITY

THROUGH a £60,000 gift by the Bristol Aeroplane Co., Ltd., the University of Bristol is to institute a department of aeronautics in the faculty of engineering. It will be called the "Sir George White Chair of Aeronautical Engineering," in memory of the founder of the company, who was a pioneer of British aviation.

It is hoped, says a joint statement by the company and the University, that this action will have a stimulating effect in the national interest by demonstrating the intention to concentrate on aeronautics at Bristol University. Training will be available to boys from secondary and public schools and to apprentices holding national certificates in engineering or similar qualifications.



FINAL CHECK-UP: A Sunderland after overhaul at Hythe.

B.O.A.C. SE

Part III—Engi of W

By

THE backbone of each air transport enterprise is its engineering section. Upon its efficiency depends the smooth operation of aircraft, the reliability and safety of transport, and last but not least, the reputation of the service. Wartime conditions calling for intensified operations with reduced fleets of aircraft, limited and dispersed man-power and skill, place an even increased share of responsibility on the "backroom boys" of air transport.

The organisation of the engineering side of a network of routes stretching from the Atlantic to the Indian Ocean and beyond, would, even in peacetime, present a series of intricate problems; in wartime the servicing and maintenance of aircraft plying across and into war zones, and the general dislocation of transport, entailed new and sudden difficulties which had to be met with a good deal of improvisation. In face of the changing conditions of war the B.O.A.C. stood up to the test and tackled these tasks with commendable elasticity and foresight.

Thus when on June 10th, 1940, Italy's entry into the war cut off the Empire flying boats from their main base, an advance group of engineers were already on the high seas bound for Durban with stores and equipment to establish new workshops. At that time sixteen flying boats were operating over the Empire route east or south of Alexandria.

Speed was essential in establishing the new base, for war conditions had created new demands for traffic on the Sydney-Durban route, and although the flying-boats were accumulating flying hours, it was essential to double the frequency as rapidly as possible. Although the B.O.A.C. engineers had to start from scratch, within six weeks of their arrival they succeeded in ensuring the doubling of frequency between Sydney and Durban.

The dislocation of Empire communications had made it necessary to decentralise the organisation of the maintenance and servicing. A separate Overseas Engineering Headquarters was accordingly set up at Durban controlling all engineering activities from the Mediterranean to Singapore. It was, in fact, an engineering enterprise not only dispersed over a vast area, but embracing the maintenance of a variety of types—flying-boats, landplanes, engines, etc.

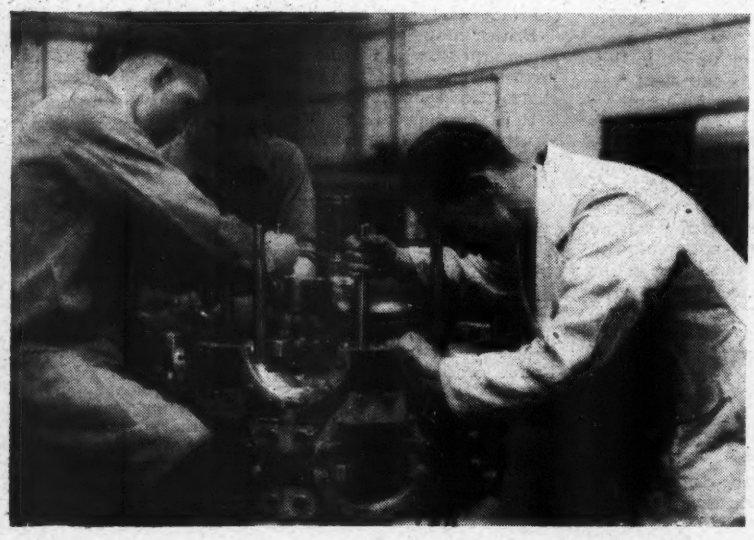
The work of these Overseas H.Q.s was not immune to the impact of war. Continual readjustments had to be made to cope with new conditions arising from changing military situations. Until the fall of Singapore about 50 per cent. of the engine changes and overhauls were carried out at the Qantas workshops at Sydney.

The system worked well and continued until, in February, 1942, Singapore fell and the route was cut again, leaving eleven flying boats to the west of Singapore. Meanwhile, the Congo service had been inaugurated. A greater range than that provided by the standard Empire boats was required, and Qantas, an associate company of B.O.A.C., undertook the manufacture and installation of extra tankage totalling 720 gallons per aircraft. Several flying boats were so equipped before the fall of Singapore. There were no facilities at all, however, for this type of manufacture in Durban, and it was necessary to gather as many suitable tanks as could be located.

Finally, as many as seven different types of petrol tank and four types of oil tank had to be employed.

The locations of the maintenance bases themselves had to be changed in consequence of military developments, while at the same time front-line duties were added to the already heavily booked working schedules.

During the North African campaign,



DISMANTLED HERCULES: Overhaul work at Treforest factory.

A.W. WARTIME SERVICES

-Engi Activities : Impact of W ditions

By ERG

SPARKS DEPARTMENT : General view of the magneto shop in a P.E.R.A. factory. Thousands of engines have been stripped and reassembled in these plants.

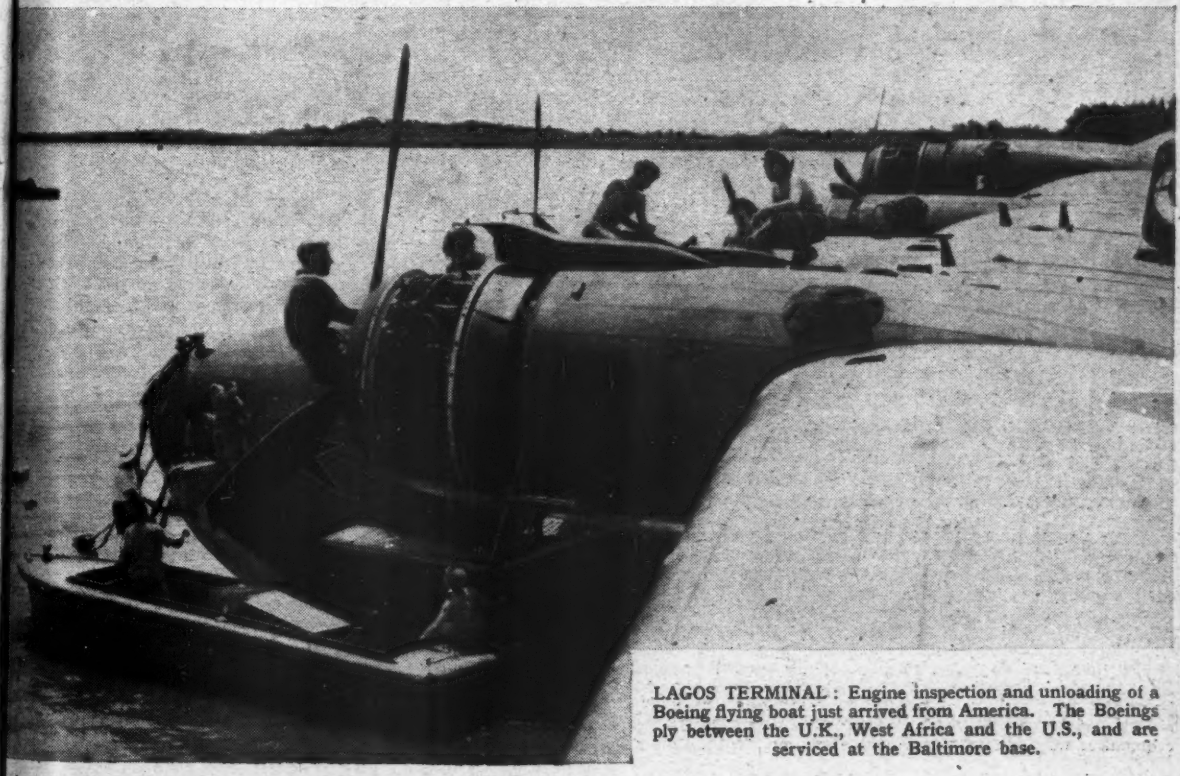
for instance, the Heliopolis workshop, originally a maintenance depot for civil aircraft on the African route, became one of the main aircraft repair centres, and in one month put back into service as many as 250 R.A.F. aircraft. In 1941 fluctuations in the desert campaign enforced the withdrawal of purely civil workshops southwards, while a unit of B.O.A.C. staff and equipment was left behind to continue work on Service machines. By the beginning of 1943 this unit returned for service a total of 2,553 aircraft, in addition to overhauls by the engine overhaul section, and the salvaging, repairing, maintenance work of scattered mobile parties in Malta, Cyrenaica, Tripoli and West Africa.

At present overseas engineering concentrates mainly at Almaza, a landplane base, and the biggest single B.O.A.C. maintenance unit employing nearly 2,000 men, at Kasfareit, an overhaul base for Sunderlands of the U.K.-India route, some 60 miles from Almaza on the Suez Canal, and at Baltimore. The last is the maintenance base for the Boeing 314A flying boats, originally chosen because of the anticipated difficulties in obtaining a regular supply of spares at this side of the Atlantic.

With the improved war situation, overseas engineering is once more controlled from the United Kingdom headquarters, and more and more work now carried out overseas will soon be done at bases in the United Kingdom.

No less were the tasks facing the engineering organisation at home. Deprived of a considerable number of skilled men who had to reinforce stations overseas, it had to be considerably expanded to meet the wartime needs and to cope with a variety of new problems. Evacuation, dispersal and the setting up of new workshops further diluted the reduced skilled labour force, and it was necessary to rely to an increased extent upon unskilled and newly trained labour. These typical wartime conditions are illustrated by the experience of 270 men from Croydon workshops whose knowledge was needed to train more than seven times their number in the essentials of workshop engineering.

Because of the shortage of transport aircraft, B.O.A.C. engineers had to take a hand in supplying and augmenting the corporation's aircraft fleet; a large number of R.A.F. machines—Catalinas, Hudsons, Liberators, Mosquitoes—had to be converted and adapted for passenger and freight carriage at the workshops at Hythe and Bramcote. New



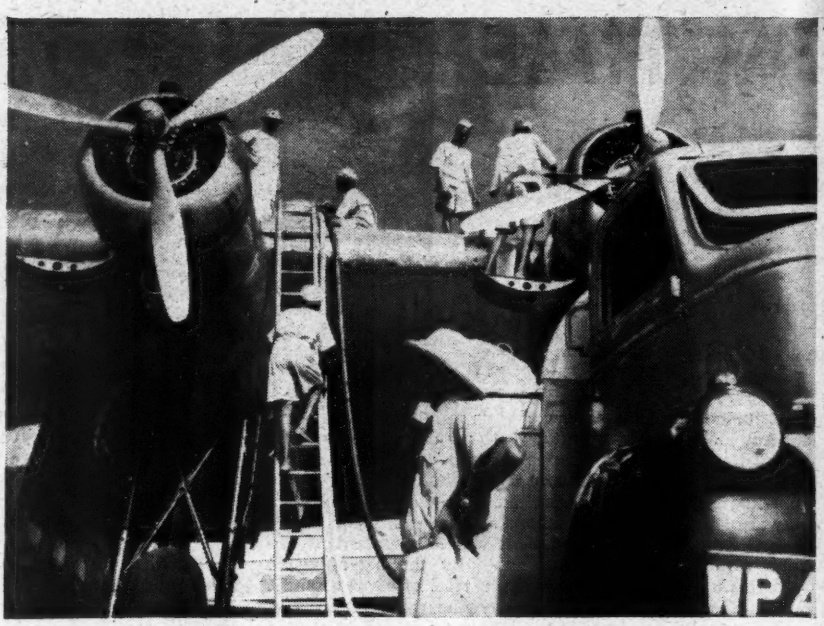
LAGOS TERMINAL : Engine inspection and unloading of a Boeing flying boat just arrived from America. The Boeings ply between the U.K., West Africa and the U.S., and are serviced at the Baltimore base.

B.O.A.C. WARTIME SERVICE

calls to be performed in record time were periodically made on the technicians, such as the refitting of four Short Empire flying boats for the 2,000 miles hop from Lisbon to Bathurst, the re-powering of Ensigns for trans-African services, etc.

But apart from the demands of the corporation's own transport services, other wartime needs made heavy calls upon the corporation's engineering resources. To cope with them a complete reorganisation was necessary, involving the opening of new plants and the migration of established ones.

From these efforts arose the P.E.R.A. (Propeller and Engine Repair Auxiliary), an integral part of the B.O.A.C. organisation, operating three units and employing several thousand men and women, mostly trained from the start by B.O.A.C. engineers.



NURSING THE EXPLORER: Gold Coast crews refuelling an Ensign at Takoradi. The Armstrong Whitworth Ensign was designed several years before the war for Imperial Airways.

The P.E.R.A. embraces, among others, the overhaul workshop evacuated from Croydon to Treforest, and the propeller overhaul and repair factory at Bath, and is operated for M.A.P.

Since its inception the P.E.R.A. has overhauled thousands of engines and many more airscrews for the R.A.F. and has rendered great services in assisting the maintenance of R.A.F. machines.

Not only has the total strength of personnel become nearly seven-fold, but what is even more important, the average rate of engine output has increased eleven times. This is indeed a remarkable achievement, especially if one remembers that over 38 per cent. of the P.E.R.A. staff are newly-trained women.

The value of P.E.R.A. to the war effort might be illustrated by even one of its many-sided activities. The section engaged upon the salvage of useful parts from crashed aircraft engines, which began in November, 1940, salvaged some 2,500 different kinds of spares in two years of its work. It is indeed this type of work, little known though it is, which is of immediate interest to the taxpayer. Some time ago, when the total cost of running this shop for a year was compared with the cost price of the total of 35 main items salvaged, a financial saving of some £120,000 was shown. This is just a fraction of the overall picture of P.E.R.A.

The M.A.P. were, meanwhile, building other plants for the repair and overhaul of aircraft and components. Specialised equipment was needed for many important processes, and the B.O.A.C. service equipment factory was asked to help. Experienced in the design and manufacture of this type of equipment, they were instrumental in producing many useful test rigs and other fixtures. Typical of their ingenuity is the hydraulic rig devised for straightening bent airscrew blades. This has been responsible for the return of many damaged blades to front-line service.

A review of the engineering activities of the B.O.A.C. would not be complete without some reference to the men who made these operations possible. Originally the system was to send engineers overseas for a period of three years. But when war broke out and difficulties in transportation followed, as well as the need for maximum numbers of skilled technicians overseas, these "contract engineers" had to remain on their posts irrespective of the length of their sojourn abroad. Theirs was the task to build up the new bases, and to do the pioneering work in training local personnel. Only recently with the improved war situation and as men of reasonable experience become available in the United Kingdom for transfer overseas, are these old-timers given a chance of returning to home bases.

POST-WAR AIR SURVEY

SIR ARCHIBALD SINCLAIR, Secretary for Air, told Rear-Admiral Sir Murray Sueter (C., Hertford) in the Commons last week that he recently caused a review to be undertaken of the way in which the air photography needed for surveying in this country and the Colonies could best be provided after the war.

The R.A.F. has specialised equipment, and work of this kind would afford valuable training. It was therefore his view that the task should be allocated to the R.A.F. The Minister for Civil Aviation was in complete accord.

Asked by Sir Oliver Simmonds (C., Duddeston) whether the policy of the Air Ministry was to eliminate all the civil firms which were engaged in air survey before the war, Sir Archibald replied that there was not very much of this work done before the war. It was now going to be undertaken on a big scale by the R.A.F. as part of its ordinary training duties. The object was to get the work done in the most efficient and economical way and to give valuable training to the R.A.F.

FOUR WORLD FLYING RECORDS

EASTERN Air Command now hold four world flying records, Reuter announced last week.

It was disclosed that R.A.F. Liberators recently completed an operational mission entailing a flight of more than 3,000 miles—equivalent to a non-stop return flight between London and Moscow. This is one of four world flying records held by Eastern Command, and never before had a Liberator attempted a combat sortie over such a distance. The other three records were:—

A round flight of more than 2,400 miles in 8 hrs. 50 mins. by a Mosquito on photographic reconnaissance—equivalent to a non-stop return flight between London and Leningrad.

A flight of 1,350 miles by R.A.F. Beaufighters to attack shipping off Tavoy (200 miles south-east of Rangoon)—equivalent to an attack on Prague or Milan by fighters based in South-east England.

A 1,500 miles flight by 2nd U.S.A.A.F. Air Commando Mustangs to shoot up Donmuang Airfield, Bangkok.

British Air Transport

Mixed Reception of White Paper in the House of Commons

SIR STAFFORD CRIPPS, Minister of Aircraft Production, introduced the Government policy on British Civil Aviation in the House of Commons on March 20th. In the main he did not add anything to the White Paper and to what Viscount Swinton had previously stated "in another place." He pointed out that the scheme is not based primarily on political compromise, but it did result in a political compromise, combining as it does a wide degree of Government control with a measure of independence of private enterprise.

While dealing with the Internal/Europe corporation, Sir Stafford said that none of the elements would have a majority shareholding, so that control would be a joint one. In connection with the subsidiary operating companies visualised, Sir Stafford said that if, for instance, we came to an agreement with Holland as to an exchange of services between London and Amsterdam, it might be convenient, in order to get the pooling required, to run such a service by a joint company, half of which would, presumably, be owned by the Dutch, the other half by the English.

In conclusion, Sir Stafford said that the scheme outlined in the White Paper was, he believed, a practical one and one which would not necessarily prejudice an ultimate solution in the direction of either extreme (complete nationalisation or complete private ownership) if, after the next general election, either extreme should be what the country wanted. He therefore hoped the House would approve and give instructions to get on with the job as rapidly as possible. One thing was certain: we could not afford to be held up by any political deadlock. That would be absolutely fatal to the future of British civil aviation.

MR. HORE-BELISHA examined the White Paper against a background of the effects of sea power as shown by history. He came to the conclusion that the Government's attempt to present a highly balanced scheme came pretty near to a negation. At Chicago we put the international cart before the imperial horse. We should have bent all our energies to creating an Imperial unit. Viscount Swinton had gone to South Africa to fix routes. What we had to do was to fix things so that we formed part of a unit that was able to talk to units like the United States and Soviet Socialist Russia. At Ottawa an Empire economic unit was created, and the principle was recorded that we should thenceforth be regarded at international conferences as an economic unit. When discussing such matters as picking up and setting down in the same national unit, one had better bargaining power if one spoke with one voice for the whole Empire than if one spoke with six or seven different voices.

Guarantee of Monopoly

Turning to the second White Paper, Mr. Hore-Belisha asked if one found in it a realisation of the greatness of the subject? Did one find an attempt to utilise the real skill and experience of the last five years? No, one found a rigid scheme. Having come to the conclusion that one chosen instrument was an error, were we to multiply the error by three and have three chosen instruments?

He complained that the Society of British Aircraft Constructors had not been called into consultation. They produced a pamphlet a short time ago setting out their views. Whether one had nationalisation or private enterprise, internationalisation or an Imperial policy, one would still have aircraft manufacturers, and their interest was to sell the best aircraft and as many as possible. They all criticised this policy of monopoly. The White Paper seemed to assume that an air route was like a street, a narrow and confined space on which one had to restrict traffic. The main characteristic of the air was that it was illimitable, and we should at the outset encourage variety. He pleaded that the American system should be considered. There should be a board to hear claims to run services.

MR. F. MONTAGUE expressed astonishment that Sir Stafford Cripps, of all people, should have been chosen to defend the White Paper. He could, he said, almost imagine that he was listening to an insurance or banking company chairman making his annual report to the shareholders. He described the White Paper as stark reaction. The Labour Party's aviation policy was well known. He admitted the international policy of the Labour Party was washed out. It was impossible with America and Canada against it. But we still had Great Britain and the Empire, and he would point out that we had turned down the two Pacific Dominions on this question of policy. For the first time shipping and railway interests were brought in and were given a public guarantee of monopoly powers in the United Kingdom. That was no compromise.

He was not impressed by the repeated reference in the White Paper to the transport experience of the railway and shipping companies. It would have been just as logical for the Thames watermen in Pitt's time to claim that their experience of transport entitled them to have control of the hackney coaches. The experience of the R.A.F. was of ten times greater importance than that of the shipping and railway companies. What aviation needed was new men with new ideas, not the hidebound prejudices of men from other and slower transport industries. On the question of subsidies, Mr. Montague said there was nothing in the White Paper to prevent the companies from coming, cap in hand, as the shipping companies had done over and over again, to the Government for support. He protested that the scheme had been worked out with the various interests without the House of Commons knowing anything about it. That was the kind of thing that was leading us towards a Fascist State.

Organisation, Aircraft and Aircrews

AIR COMMODORE HELMORE wanted to deal with one of the three essentials of air transport which were: organisation, aircraft and aircrews. The greatest of these was aircrews. In this war we had had on the whole very good organisation and very good machinery. But what had given us ascendancy had been the individuals who controlled the machine. So in peace we should have to lean heavily on our civil aircrews, and thus their selection was highly important. He was not satisfied with the phrase in the White Paper which dealt with this. When the fat jobs of peace came along there was always provided, particularly under a monopoly, a rich breeding ground for nepotism and favouritism in selection. He wanted an assurance that the Government would give first priority to the operational aircrews of the R.A.F. and Fleet Air Arm. By their selfless efforts these men had made the air free for civil aviation. Judged by any standard they must be assessed as the finest material in the world for flying civil aircraft. He thought the statement misleading which dealt with openings in civil aviation. Such openings would be far less numerous than the phrasing in the White Paper suggested.

SIR OLIVER SIMMONDS said he was indebted to Mr. Hore-Belisha for the brilliant examples he gave of the importance of private enterprise. He was sure he was speaking for a large number of his hon. Friends "on this side" when he said that the White Paper represented no Conservative policy. If he felt it was being held out as a Conservatice policy he would vote against it. The only possibility of Conservative Members supporting the policy of the White Paper was in their putting country before party and thus settling the old controversy on what was going to happen to British air transport. He would prefer to see the whole issue left until after the General Election, but that would be wrong when other countries were fitting wings to their aircraft for the civil routes at an astonishing rate.

If they (the Conservative Party) supported this policy, Sir Oliver continued, it could only be if it represented a fair agreed policy between the Conservatives, Liberal and Labour Parties. If not, it was completely useless. What he wanted to know was whether or not they were to regard this measure as putting air transport out of party politics for a reasonable period of years, or whether they were going to have the eternal wrangle which had gone on in the House for the last seven or eight years and which had done no good either to British air transport or to its reputation throughout the civilised world.

Sir Oliver welcomed the suggestion of two corporations which would run without subsidies. That should appeal to the Chancellor of the Exchequer. And he pointed out that British air transport could be a very important invisible export. If the lines were run well, they could bring us a substantial amount of foreign currencies from the corners of the earth. He recalled that the railway and shipping companies had for many long years had to do something which B.O.A.C. had never had to do: make ends meet. He had vainly tried to find out what B.O.A.C. was costing the taxpayer. It must be many millions

BRITISH AIR TRANSPORT

of pounds sterling per annum. In contra-distinction, in America, in 1943, the internal airlines repaid in taxes on their profits from air mail no less than 33 million dollars, or more than £8 million. It was logical to suppose that we could mould into B.O.A.C. something which would cost the taxpayer less if we could join with it organisations which had learned to run their transport economically. As chairman for two years of the Joint Air Transport Committee of the F.B.I., the Association of British Chambers of Commerce, and the London Chamber of Commerce, he had found in the railway and shipping companies a single-minded desire to render service in the air transport era. They did not ask the Government for a monopoly. The monopoly was forced upon them by the White Paper. He thought it a great mistake that there should be any monopoly area within the White Paper scheme. Outside this country we should have competition from the foreigners, but why could we not have some internal competition? He suggested that Scotland, which had been running a high temperature on the subject of Prestwick, should form a Scottish Air Transport Organisation. Thus there could be competition within the British Isles. Sir Oliver then argued, as did we in our Editorial Comment recently, that since the scheme visualises a comprehensive schedule of routes and services, there will be a precious small chance of other organisations coming in. That was a fundamental defect in the White Paper. It was essential that young men be given an opportunity to come in. They would chafe at the lack of enterprise in the three corporations. People would be willing to back them with money.

Space and Systems

MR. WILFRID ROBERTS said three different views had been expressed. Sir Oliver Simmonds wanted to get away from the present system. Mr. Hore-Belisha wanted the American system of many independent companies working for profit, licensed by tribunals. The B.O.A.C., to do them justice, had never had an opportunity to operate. Did Mr. Hore-Belisha want the American system for Britain alone or for the Empire? The American system worked well because they had a great land continent. Was Great Britain, or even Great Britain and the European services, big enough to accommodate the introduction of the American system? He thought there might be two internal airlines, one operating on the East Coast and one on the West Coast, and that would be an advantage. He doubted that the two would experience very much competition, but at least we should have comparison. He did not find much fault with the South American proposals. They would be up against fierce competition, presumably from Pan America. He thought it high time the railways were nationalised, and we should leave a new and upcoming industry like civil aviation more freedom. He would like to see the railways limited to less than a 50 per cent. interest, and find enterprising people who would risk their capital, possibly aircraft makers as well as operators. He thought the prevailing defeatism ill-founded. Surely our war record entitled us to expect that, sooner or later, we should catch up with our competitors. He did not regard luxury as essential on short routes, and thought we could adapt some of our wartime aircraft; that would be better than buying expensive American aircraft.

Mr. Roberts wanted to know whether we proposed to operate in the Caribbean Sea, between the islands in the Pacific, and between Canada and Australia, or whether there was international agreement that we should not do so. As to the Minister's statement about choosing at the time of the General Election, it was a difficult situation for the companies which were asked to risk their capital by putting it into companies out of which they could not take it.

LT.-COL. SIR THOMAS MOORE referred to what he called a very serious omission from the White Paper: there was no mention of an airline either in Scotland, for Scotland, or operated by Scotland. Scotland had its own shipping lines and built the best ships for the English shipping lines. Scotland, with its vast experience, its great capacity and its highly skilled craftsmen, was not going to be left out.

All the airlines proposed in the White Paper, except perhaps B.O.A.C., were problematical of success. In Scotland they had a civil organisation, built up over nine years and at present employing 5,000 people, with invaluable knowledge and experience, which no shipping nor railway company could have. He referred to Scottish Aviation, Ltd. (*Hansard* reports it as Scotland Aviation.—ED.). He wanted to know why this great organisation in Scotland had been ignored. He warned the Government that Scotland would not stand for this narrow Socialist policy.

MR. BOWLES urged that the whole matter be taken not only out of the hands of private enterprise, but out of the hands of any Government, even out of the hands of Continental Powers like the United States, or even out of the hands of a body representing Pan-European Airways. He believed the matter had to be put on a world basis, and that nothing smaller than that would suffice to maintain the peace of the world.

He asked why the Director-General of Civil Aviation did not go to Chicago? The majority of Lord Swinton's assistants were connected with the military side of the Air Ministry.

MR. HENRY BROOKE said he spoke as a director of the Southern Railway, as he thought it right the House should have on record an authoritative statement about the railways' position. Referring to Air Comdre. Helmore's plea for first priority to be given to aircrews of the R.A.F., so far as the railways were concerned, that was their intention. They desired to obtain as many suitable men from the R.A.F. as they could.

The real test of the proposals was not whether they pleased this or that interest or party; it was the value of the public service which the corporations could render. He was grateful to Sir Oliver Simmonds for his independent testimony, and would add his own first-hand testimony that the railways were dead keen on making a success of whatever opportunity the House decided to give them in the air.

He warned Members not to argue too swiftly from American experience. America had three times the population, the distances were much greater, and potential attraction of air travel was much greater than here. A whole collection of small companies could not do our job. There had to be both financial and technical strength behind the companies.

MRS. MAVIS TATE thought that she was the only Member of her party who voted against the continuance of the subsidy to Imperial Airways until 1953; she did so because even then she was against the policy of the single chosen instrument. To-day she was unhappy because the same complacency seemed to run through the White Paper. She regretted the very narrow aspect from which so many people regarded the problem to-day. She was not wholly satisfied with the White Paper because although the policy of a single chosen instrument had been given up, they were to have three chosen instruments and she thought there would be little improvement if they were going to be more or less under one control. There still appeared to loom the ossified brain and the dead, skinny hand of bureaucratic control in this scheme. We should not ignore the fact that although the White Paper had been received with praise in this country, it had also been received with hoots of joy in America. She had made no bones of her intention to capture 70 or 80 per cent. of the traffic on world's air routes, and if she regarded this White Paper as so satisfactory it was worth our while to take a second look at it.

South American Service

Concerning the South Atlantic route, Mrs. Tate recalled that the late Sir Philip Sassoon had stood at the Box and given a categorical promise that this country would fly to South America by the spring of 1938. When 1939 came we were still paying the French and German lines £37,000 to carry our mails across the South Atlantic. She described as appalling the paragraph in the White Paper dealing with this route, and quoted it as follows:—

> "The trunk route from the United Kingdom to South America presents a new field for British civil aviation. It is one which our long and close relations with the States of that Continent make it essential that we should enter."

Mrs. Tate argued that if we were to build up our foreign trade, Empire unity, Empire communications, our prestige and our influence, we must give first-class service. To do that we must have on our routes the best aircraft that could be manufactured, and she argued that it would be many years before we could produce them. She pleaded for an appreciation of the important part women could play, as hostesses, for instance.

MR. HYND thought it surprising that the Minister should have made the statement that to organise civil aviation in this country under one central operational unit was too vast an enterprise to be considered. They had a few days ago a remarkably fine statement from the First Lord of the Admiralty, who made no apology for the size of his operational units or instruments. There was no great enthusiasm in the House for the White Paper. A new age was dawning, and it might have been expected that the Government would approach this in an entirely new way which would enable them to avoid the mistakes of the past in all branches of surface transport. There

BRITISH AIR TRANSPORT

had been so much disorganisation and confusion in an era of private enterprise controls that it had been necessary, time after time, to establish Royal Commissions and committees of inquiry in order to get some kind of order from this confusion. Apparently some hon. Members desired that in civil aviation we should start at the beginning of this old story and work through the same process.

The Government had sadly failed in this respect. The White Paper was one of those typically mongrel devices they had come to expect from the Coalition, and it was to be hoped that Members would feel that the Coalition had gone about as far as it could go. He drew a comparison between the White Paper scheme and what had happened in other spheres. The claim that railways could contribute experience, but it was not the shareholders, nor even the directors, who had experience of handling booking offices and travel agencies, driving trains or catering. It was the administrative staff, the workers. If that were so, what was there to prevent the Government advertising and securing the services of those people who could serve the State as well as they could serve private owners? There was competition with foreigners, but none between rail and shipping interests and the B.O.A.C. Therefore he did not see the necessity for bringing in this concern in order to provide efficiency within the industry itself. The Government had come to the House with a stratagem. It was an expedient, just as the 1941 Act was an expedient to avoid the inevitable creation of a nationalised service.

B.O.A.C. Control

CAPT. PLUGGE said he had listened to the many speeches that had been made, and he thought all but one had been in severe and truthful criticism of the White Paper. He thought there was one sentence in the White Paper which spelled its doom: "The Government are convinced that the policy of the single chosen instrument . . . is unsuited to deal with the great expansion of the future." Now there were to be three chosen instruments, but were they really three? He thought B.O.A.C. would have control. It was a majority holder in the whole group of the three branches. He estimated that B.O.A.C. would have 170 per cent. holdings out of the 300 per cent. that represented the three-branched chosen instrument.

Directors were not allowed to be elected freely; they were subject to the veto of the Minister, which, in reality, would mean the veto of the B.O.A.C. If the chairman of the B.O.A.C. were to say: "I do not like that particular man who has been put forward by the railways," then the Minister would also say that he did not wish that man to be on the board.

What we needed was competition among ourselves. The White Paper said it was compiled to avoid competition. What greater competition could we have than that of all the foreign lines, some twenty of which would be competing with the one suggested European corporation? He suggested we should have a licensing authority. There should be an independent tribunal for appeals against the licensing authority. The general considerations should be: a company should fly British aircraft only. It should have sufficient capital to run its line efficiently over a certain period of years, even at a loss. It must satisfy the authorities from the point of view of safety measures. It should employ British staffs only.

MAJOR-GENERAL SIR FREDERICK SYKES complimented the Government on the appointment of a Minister for Civil Aviation, but found himself unable to contribute to the chorus of approval of the White Paper which, he thought, would need a good many amendments before passing into law. He was against monopolies and thought the task of B.O.A.C. ought to be lessened and consolidated rather than enlarged. He would have preferred to have five or six corporations instead of three. He deplored the suggestion that there should be a monopoly of maintenance, arguing that unless maintenance is under the company which operates the airline it cannot be responsible for the airline operation itself.

He hoped that after the war a licensing authority would be set up which would have completely independent status. He would like to see one or two companies dealing with this country and with Europe, one for Northern Europe and one for Southern Europe. He would have one to South America and one to North America, one to South Africa and one to India and Australia.

MAJOR MCCALLUM lamented the omission of Scotland from any consideration in the White Paper, and MAJOR NEVEN-SPENCE paid a tribute to those who had blazed the trail in the North of Scotland, Gandar-Dower and Fresson. They had risked their wealth and their lives, and yet the White Paper spoke in contemptuous terms of these independent operators.

MR. LENNOX-BOYD, Parliamentary Secretary to the Ministry of Aircraft Production, replied for the Government. He said the plans had been supported by the National Government and by all parties, and thought it therefore unlikely that there would be violent changes of policy after the General Election. He felt the White Paper plan was a compromise in its very nature and was something acceptable to all sections of the House.

Concerning Air Commodore Helmore's plea for priority to aircrews, he uttered a word of warning, and said that for the immediate future only some 1,000 people would be required for all the civil aircrews.

The Capetown Conference

(*Cabled Exclusively to "Flight"*)

SIFTING behind closed doors, the South African Air Transport Conference in its first day apparently settled the most important questions in connection with an air service between Britain and the Union.

As soon as possible a joint service of British and Union aircraft will be established between London and Johannesburg. For this, South Africa, and possibly Britain, will use aircraft of British manufacture. Control of the service will be exercised by South Africa to a point just south of Nairobi, with the rest of the route under the control of Britain. This service will be regarded as a trunk service, as compared with regional services, and will be the binding link between African territories, carrying all freight and passengers down Africa from Europe, North Africa, Asia, Australia, and perhaps America. In respect of air traffic to South Africa, Britain will be more or less in the monopolistic position which existed before the war.

The service will begin in July, it is hoped. Aircraft will fly night and day, landing only to take on passengers and freight or fuel, and completing the journey from London to Johannesburg within forty-five hours.

The service, probably weekly to begin with, may later become bi-weekly and later still daily, with Avro Yorks. The tentative route is Johannesburg, Kasamo, Nairobi, Khartoum, Cairo, Malta and London. Later when the aerodrome is ready, landings will be made at Salisbury, Rhodesia, instead of Kasamo, and it is also planned apparently to substitute Rome later for Malta.

Summing up the initial work of the conference, the Governor of Kenya and leader of Kenya, Tanganyika, Uganda and Zanzibar delegation, Sir Philip Mitchell, told Reuter: "I am sorry I cannot give you sensations, because this is a family party which is getting on so well that there can be no sensations." Sir Philip said the purpose of the conference more than anything else is "to find out what is expected of us."

"Our object is to participate as a group of territories and as good neighbours with other commonwealth countries for the purpose of giving the public the best possible air service at the cheapest possible price." Sir Philip revealed that any Kenya domestic services would be run by commercial management "under control of government."

He said that Kenya is planning to attract great tourist traffic by air, and legislation was now before the Kenya legislature for the creation of "a most astounding, spectacular game reserve with a greater variety of flora and fauna than anywhere else in the world." Nairobi, it is hoped, will become one of the great air junctions of the

THE CAPETOWN CONFERENCE

world, not only from north to south, but also from east to west.

He stressed that the conference decisions were only recommendations which would have to be approved by the respective governments. Later, Portugal and Belgium would also be approached with a view to the co-operation of the Congo, Mozambique and Angola. He also stressed that there had not been the slightest disagreement among the delegates.

The conference has also decided to establish a Southern African Air Transport Council which will operate in conjunction with the larger commonwealth Air Transport Council recently formed in London. Each territory represented at the Capetown Conference should be represented by a member on the Southern African Council, Northern and Southern Rhodesia, Kenya, Tanganyika, Uganda and Zanzibar should each count as single units in this respect. There will be a complete partnership, short of amalgamation between the B.O.A.C. and the Union Airways.

Members of the councils' secretariat would meet alternatively in the Union, Rhodesia and East Africa. The Minister of Transport announced that foreign aircraft will have to land at Johannesburg only. Arrangements are being made with the U.S. and there is a chance that South African aircraft may be able to go to New York at some later date. A weekly service is under consideration.

CIVIL AVIATION NEWS

COURIER TRAFFIC

AN agreement has been reached between the Swedish and American Governments on mutual courier air traffic between the two countries pending the opening of regular commercial air traffic.

NEW YORK PLANS

THE recognition of New York as a starting point for air services to the Far East is urged by the Port of New York Authority.

Post-war services starting from New York, it is claimed, should use the direct route via Winnipeg, Edmonton, Alaska to Tokyo, from where they would branch off to Hong-Kong and Manila.

UP IN ARMS

TEMPERS are running high in the States, where a controversy is raging on what should be the future policy of overseas air routes operations.

Some domestic operators are trying to break the monopoly at present enjoyed by Pan-American World Airways by asking for licences to operate overseas services.

Pan-American retaliated by applying to the C.A.B. for permission to operate non-stop services over eight internal trunk routes.

No attempt is made to hide that this would present existing operators with serious competition. Pan-American propose to cut flying time by half by using huge 204-passenger clippers, with fares substantially reduced. The trip from New York to Miami, for instance, would take only 3 hours.

From Nevada comes the voice of Senator McCarran urging the establishment of a single airline to operate all overseas routes. The "biggest of all," this company should be based on the participation of all domestic operators, have a 50 million dollars capital and an unlimited backing of the State Department, says the Senator.

MEETINGS

MEETINGS have taken place recently between Sir Harold Hartley, vice-president of the L.M.S., Mr. John Elliott, of the Southern Railway; and independent airline operators, in connection with the Government's proposed civil aviation plans.

The meetings followed upon a suggestion by Lord Swinton, Minister for Civil Aviation, after he met the independent companies.

Although nothing has been revealed of what took place at these meetings, it is known that not all independent operators participated. "So far only the more powerful of the independent operators have been approached, hoping that they will give away and so weaken our case," said the Hon. Mrs. Victor Bruce, of Air Dispatch. And somewhat dramatically she commented: "It is tantamount to going around with a cheque book and a hammer. I shall fight for our rights and independence to the end."

AIR CAR FERRY

NO longer will air passengers to the Isle of Wight have to leave their cars behind in their garages. A post-war scheme outlined by Mr. L. M. J. Balfour, managing director of Portsmouth Aviation, provides for an air car ferry between Portsmouth and Ryde, operated with Bristol freighters. Charges are not likely to be higher than those on the steamer ferry.

As recorded in *Flight*, March 22nd, Portsmouth Aviation, Ltd., have formed a company in partnership with Railway companies for the development of Isle of Wight services. The company is to be known as the Isle of Wight Airways, and will operate services to the island from Portsmouth, Southampton, Bournemouth, Shoreham, and from a point in the Bognor-Littlehampton-Chichester area.

COSTA RICA SIGNS

THE U.S. State Department announced that Don Francisco de P. Gutierrez, Ambassador of Costa Rica, on March 10th signed the following agreements concluded at the International Civil Aviation Conference in Chicago on December 7th, 1944: Interim Agreement on International Civil Aviation; Convention on I.C.A., International Air Services Transit Agreement (two freedoms); International Air Transport Agreement (five freedoms).

Including the signature of the Costa Rican Ambassador, 42 countries have signed the Interim Agreement, 40 countries the Convention, 34 countries the Transit Agreement, and 22 countries the Transport Agreement.

EIRE'S EXPENDITURE

DURING the coming year the Eire Government proposes to increase considerably the amount spent on the Dublin Airport. According to the Public Service Estimates, which have just been issued in Dublin, the following allocations have been made for constructional works, including maintenance and furnishing of buildings, at Irish airports during 1945-46. Last year's allocations are given in brackets:—

Dublin Airport, £100,000 (£2,200); Shannon Airport (Foynes), £187,000 (£95,000); Shannon Airport (Rineanna); £320,000 (£375,590). There is a token vote of £10 for "other airports and emergency bases."

A sum of £60,000, against £1,500 in 1944-45, is to be voted for compensation to owners of lands acquired in connection with airports.

Aer Rianta—the national air transport company—is to receive £19,000 by way of a subsidy, compared with £32,500 last year. The same company will also receive £13,100 (£10,800 in 1944-45) for the management of the Dublin Airport on behalf of the Department of Industry and Commerce.

THE SHARE OF SHIPPING

A FEW more hints on the future participation of shipping in air transport were given by Lord Swinton in Capetown. Supplementing, as it were, the plan outlined in the White Paper, he said that shipping air lines would form subsidiary companies to look after the flying side of their activities. The directors of these companies would have to be approved by the British Minister of Civil Aviation.

Referring to air services between South Africa and the United Kingdom, the Minister said that the Union Castle and some other lines might join the B.O.A.C. as junior partners, should they so desire. On the Atlantic, Far Eastern, and other routes shipping lines could likewise join in air transport operations on the same basis, but their share in such services he foresaw as not more than 25 per cent. This is not meant to be a fixed proportion, and may vary on the different routes.

Only liner companies maintaining regular sea services would be allowed to participate in the air services. Tramp ship owners would not be eligible.

CORRESPONDENCE

The Editor does not hold himself responsible for the views expressed by correspondents. The names and addresses of the writers, not necessarily for publication, must in all cases accompany letters.

AT SONIC SPEEDS

Another Instrument for the Pilot

REGARDING the entry of aircraft speeds into the region of sonic speeds with the consequent compressibility effects, would it not be advantageous to the pilot if he were provided with a Mach value indicator?

At the moment all the pilot has is a graph of limiting speeds for various altitudes, which is usually given in the pilot's notes, and sometimes, although rarely, reproduced and placed in the cockpit. These, in relation with the I.A.S., will give him the critical conditions, but it appears to be a rather roundabout way of providing the information.

Again, error will be present unless the curves are corrected for I.E., and, possibly, P.E. in the case of modified types.

All this could be eliminated by the provision of a simple aneroid instrument similar to an A.S.I. and corrected and calibrated to read Mach numbers.

In the opinion of the undersigned such an instrument would be a real boon to those who have to fly high in really quick aircraft.

CLAUDE ALDBURY.

AIRSCREW BLADES

The Old Argument Again!

WITH reference to "Aged's" letter which appeared in the February 15th issue of *Flight*, might I refer him to copies of *Flight*, May 20th, 1943, and June 3rd, 1943, in which the subject of bent-metal blades was discussed?

He will find there a series of letters all carefully pointing out that when the tips of a metal airscrew strike an obstruction the blade-tips are bent backwards, not forwards. The question is one of relativity, and the speed of the aircraft must be taken into account, as well as the motion of the airscrew. If "Aged" can find any pictures of damaged airscrews he will, I think, find that in all cases the blades are bent backwards.

Sorry, "Aged"; perhaps you're looking at that slide-rule upside down.

O. W. CARR.

Better Than Tangled Contra-props

J. R. F. WAREHAM and W. E. Lang in their letter (*Flight*, March 15th) summed up very concisely the factors governing the bending of airscrew blades on striking an obstuction.

I must agree that the possibility does exist that in the case of a contra-rotating type the leading bank blade *might* clear the way for the following blade of the rear bank, providing that the leading blade tip was bent forward—a condition that can satisfactorily be fulfilled on paper but which seems almost impossible of fulfilment in actual practice.

I am given to understand that it is considered impractical to fit metal blades on contra-rotating airscrews because of this problem; not, I believe, in the light of damage to the airscrew itself, but because the engine will be forced to a standstill in a fraction of a second, due to the tangling of the blades. One can easily imagine the consequences; various parts would undoubtedly shear, but not enough to reduce the torsional reaction in the engine to a point where the latter would remain in the airframe—a very sticky do! Wooden blades, of course, would themselves shear and disintegrate on interference as between the two banks, and thus at least save the engine-aircraft-pilot combination.

HILERY FITZ-HALBERD.

Never the Same Conditions Twice

WITH further reference to the subject of cropped airscrew blades, may I be permitted to reply to Messrs. Wareham, Lang and Ingram (*Flight*, March 15th)?

It is obvious no formula can be arrived at to determine the angle of bend which a blade will take owing to the wide variety of conditions which have to be taken into consideration. In fact, it is doubtful whether the same set of conditions could ever occur more than once.

However, it is fairly safe to assume that if the throttle is well open the blade will churn its way forward beyond 60 degrees in water, sand or soil owing to its screwing action. This proves that an airscrew is a very inefficient device, due to the large amount of slip which takes place in air. The pitch of the airscrew will affect angle of bend, and coarse pitch should create greater bending force than fine pitch, even though r.p.m. may be lower. If a blade strikes a solid object it should bend backwards owing to the absence of screwing action.

The above notes are based on the assumption that the machine is flying straight and level. It is interesting to observe that on machines which have made belly landings the airscrew blades bend backwards, as the throttle is closed just before touching down, and contact with the ground simply stops rotation.

Mr. Ingram's remarks on actual experience of wooden blade airscrews are very interesting and illustrate the chief advantage of them. Where larger numbers of blades are used—i.e., five and six blades—the weight factor favours wooden blades, so their use is likely to be wider, at any rate for Service use. I imagine that they will not be so popular for commercial use where maintenance costs have to be considered, as metal blades are not so easily damaged.

N. V. BRITTAIN.

SELLING AIR SAFETY

Mistaken Impression Needs Correcting

SOMETHING in the nature of a large-scale publicity campaign would appear to be necessary in order to "sell" to the British public the important fact that the degree of safety provided by civil aviation will be far greater after the war than ever before.

This is made all the more necessary when one hears, via the B.B.C., wildly inaccurate statements guaranteed to frighten many people away from the idea of travelling by air transport.

Opinions on the value of the "Brains Trust" as a regular broadcast feature vary considerably, but many thousands of Britain's civilian population—all potential customers for post-war civil aviation—undoubtedly listen to this feature, and they recently heard Dr. C. E. M. Joad and Miss Barbara Ward express the opinion that the expected expansion in civil flying would result in a marked decrease in public safety. Admittedly one other member of the "Trust" (I think it was the voice of Lord Samuel) put in a useful counterblast to this ill-informed comment, but the mere fact that two persons presumably qualified to sit on this highly-paid panel think on the lines indicated, surely suggests that many other ordinary people labour under the same delusion. And even allowing for the corrective effect of the contradiction upon the listener, much damage must inevitably have been done by their remarks.

Dr. Joad went so far as to say something to the effect that he didn't know why we wanted civil aviation at all, and even though he is widely known as an antagonist of everything fitted with an I.C. engine (possibly including motor lawn-mowers?) his attacks on road and air transport are bound to have some ill-effect. One can imagine that far too many listeners will fail to appreciate that even so eminent a "brains truster" as Dr. Joad may occasionally air opinions on subjects upon which he is, to put it politely, not adequately informed.

Miss Ward, for whom I have the greatest admiration and who usually disagrees in spirited fashion with Dr. Joad, did not go anything like so far as he did, but said, in substance, that the greatest danger would come from young men dashing about the sky in private aircraft; her contribution to this propaganda against civil aviation was, in fact, mainly directed against the post-war owner-pilot and flying-club member.

The subject of air safety arose in answering a particularly silly question based on the wholly inaccurate premise that "we are constantly reading of aircraft crashing on to houses——." As somebody else pointed out at the time, we are not *constantly* reading of such accidents; we only hear of very occasional ones, having regard to the enormous number of service aircraft flying over the country to-day. But clearly there is some degree (how great it is impossible to assess) of public misconception, and unless Britain's civil aviation is to restart with this additional handicap, it is high time something was done to correct it.

It might be thought that the publicity given in the daily newspapers to the White Paper, and the subsequent debates in Commons and Lords, would be enough at least to make the public realise that civil aviation is nationally important, but my guess is that a big proportion will just regard it as part of the political game. Thus a publicity campaign, sponsored by the Government, should aim at divorcing it from any merely political atmosphere.

"REALIST."

SERVICE AVIATION

INEXORABLE: Britain's new aircraft carrier, the *Implacable*, seen from an escort carrier, H.M.S. *Trumpeter*. An Avenger is just leaving *Trumpeter's* flight deck.

Royal Air Force and Fleet Air Arm News and Announcements

Promotions

MEDICAL BRANCH.

Air Vice-Marshal (temp.) A. F. ROOK, O.B.E., F.R.C.P., M.R.C.S., D.P.H., K.H.P., is granted the rank of Air Comdre. (war substt.). Jan. 16th, 1945.

Group Capts. (Act. Air Vice-Marshals) granted the rank of Air Comdre. (war substt.). Jan. 16th, 1945.

C. P. SYMONDS, C.B., M.D., F.R.C.P.

G. L. KEYNES, M.D., F.R.C.S.

Awards

Fleet Air Arm

THE KING has been graciously pleased to approve the following awards for courage, skill, daring and devotion to duty whilst operating from, or serving in, H.M. Ships *Victorious*, *Indomitable* and *Indefatigable* in an attack on an enemy oil refinery in the Far East:

Bar to Distinguished Service Cross

Act. Temp. Lt. Cdr. (A) W. STUART, D.S.C., R.N.V.R.

Distinguished Service Cross

Temp. Sub. Lt. (A) D. J. SHEPPARD, R.C.N.V.R.

Royal Marines

FOR courage, skill and daring whilst operating from H.M.S. *Indefatigable*:

Distinguished Service Cross

Capt. (Act. Maj.) V. B. G. CHEESMAN, D.S.O., M.B.E., R.M.

Royal Air Force

THE KING has been graciously pleased to approve the following awards in recognition of gallantry and devotion to duty in the execution of air operations:—

Bar to Distinguished Service Order

Act. Wing Cdr. G. W. CURRY, D.S.O., D.F.C., R.A.F.V.R., No. 627 Sqn.—Wing Cdr. Curry has completed a second tour of operational duty during which he has completed many notable sorties. On one occasion he took part in an attack which resulted in the breaching of the Dortmund-Ems Canal. On another occasion Wing Cdr. Curry led the squadron on a target far into enemy territory. Whilst over the target considerable anti-aircraft fire was encountered. Every aircraft was hit. Nevertheless, the operation was completed successfully. Munchen-Gladbach, Stuttgart, Brunswick and Bremerhaven have been among the various targets Wing Cdr. Curry has attacked. This gallant and resourceful squadron commander has set a splendid example to all.

Distinguished Service Order

Act. Wing Cdr. D. A. CRACKNELL, D.F.C., R.A.F.V.R., No. 35 Sqn.—This officer was pilot and captain of an aircraft detailed to attack Dusseldorf one night in November, 1944. Before reaching the target the aircraft came under fire from the ground defences and was hit several times. Despite this, Wing Cdr. Cracknell went on to execute a long and steady bombing run. The accuracy of the attack was well proved by the photograph obtained. This officer has completed many sorties on his third tour of operational duty and has displayed great personal gallantry and devotion to duty.

Act. Wing Cdr. D. T. WITT, D.F.C., D.F.M., R.A.F., No. 635 Sqn.—As pilot of aircraft this officer has participated in 100 sorties, many of them against the most heavily defended targets. His last three missions were against Essen, Cologne and Dusseldorf respectively. On each of these occasions he pressed home his attacks with the greatest determination in the face of intense anti-aircraft fire to obtain good results. He has displayed the highest standard of skill and bravery, setting an example of a high order.

Act. Sqn. Ldr. J. R. DOW, D.F.C., R.C.A.F., No. 635 Sqn.—Since being awarded a bar to the Distinguished Flying Cross this officer has participated in many sorties against dangerous targets. The success achieved reflects the greatest credit on the efforts of Sqn. Ldr. Dow, whose skill and determination have been outstanding. On one occasion, in September, 1944, he was air bomber in an aircraft detailed to attack a target near Calais. Owing to the proximity of our ground forces, precise bombing was essential. Considerable anti-aircraft fire was directed at his aircraft whilst over the target. Nevertheless, Sqn. Ldr. Dow executed a successful attack from a low level. This officer has displayed the finest qualities of gallantry and devotion to duty.

Act. Sqn. Ldr. N. A. J. MACKIE, D.F.C., R.A.F.V.R., No. 571 Sqn.—This officer has completed a third tour of operational duty during which he has attacked a wide variety of targets in Germany. He is a fearless and devoted captain whose splendid example has been well reflected in the fine fighting spirit of his crews. In November, 1944, Sqn. Ldr. Mackie led a formation of aircraft in an attack on Duisburg, one of the most heavily defended targets in the Ruhr. Considerable heavy and accurate anti-aircraft fire was encountered on approaching the target, but Sqn. Ldr. Mackie kept his formation well together to execute a good attack. This officer, who has always elected to take part in the most dangerous operations, has set on example of a high order.

Act. Sqn. Ldr. B. MOORCROFT, D.F.C., R.A.F.V.R., No. 635 Sqn.—This officer has participated in many sorties since being awarded the D.F.C. In addition to his notable work in the air, Sqn. Ldr. Moorcroft has rendered valuable service in the training of other members of the squadron.

Act. Sqn. Ldr. G. A. PATRICK, D.F.C., R.N.Z.A.F., No. 35 Sqn.—Sqn. Ldr. Patrick has an impressive operational record, having participated in 118 sorties. On one occasion, in November, 1944, he was a member of the crew of an aircraft detailed to attack Dusseldorf. Soon after the take-off all the wireless navigational aids became unserviceable. Nevertheless, Sqn. Ldr. Patrick navigated the aircraft to target, which was successfully attacked. His faultless work on a sortie, the success of which depended on accurate timing, was worthy of the highest praise. His strong sense of discipline, great resolution and devotion to duty have set an example of a high order.

Act. Sqn. Ldr. H. J. SANDERSON, D.F.C., R.A.F.V.R., No. 139 Sqn.—This officer has displayed outstanding keenness for operational flying. He has completed a third tour of operational duty during which he has attacked a variety of targets in Germany. He has displayed a high degree of courage and resolution in pressing home his attacks, often in the face of intense anti-aircraft fire. On one occasion whilst over Berlin, a target he has attacked no less than ten times, his aircraft was illuminated in the searchlights. Despite this, Sqn. Ldr. Sanderson maintained a steady run in to attack the target with accuracy. His determination was typical of that which he has shown on all occasions. This officer has proved of tremendous value to the squadron.

Flt. Lt. A. MITCHELL, D.F.C., R.A.F.V.R., No. 571 Sqn.—Since being awarded the D.F.C. this officer has completed a large number of sorties, including twelve attacks on Berlin. He has displayed exceptional skill and great personal courage in pressing home his attacks, the accuracy of which has been proved by the number of good photographs obtained. He has displayed the greatest keenness for air operations and has completed more than a hundred sorties.

Act. Flt. Lt. E. E. STOCKER, D.F.C., R.A.F., No. 582 Sqn.—This officer continues to display a high degree of skill and courage in air operations. He has participated in a hundred sorties most of which have been against targets in Germany. His skilful and resolute work has been largely responsible for the many successes obtained. His example has been of a high order.

Act. Group Capt. J. A. INGHAM, D.F.C., A.F.C., R.A.F.V.R., No. 83 Sqn.—This officer has completed a very large number of sorties against strongly defended enemy targets, including five attacks on the German capital city. He has dis-

SERVICE AVIATION

played the highest qualities of leadership and bravery and throughout his skill has been outstanding. In December, 1944, Group Capt. Ingham took part in an attack against targets at Gdynia. In spite of fierce fire both from batteries on the shore and the guns of all the German ships in the harbour, this brave pilot executed his attack with the greatest skill and coolness. His sterling qualities have impressed all.

Flt. Lt. L. C. E. DEVIGNE, D.F.C., R.A.F.V.R., No. 627 Sqn.—Since being awarded the D.F.C. this officer has completed many sorties, including attacks against the Mitteland Canal on two occasions and the heavily defended targets of Munchen-Gladbach and Munich. Throughout these operations Flt. Lt. Devigne has displayed the highest standard of skill and gallantry. His meritorious efforts have contributed in good measure to the successes obtained.

Act. Wing Cdr. F. R. BIRD, D.F.C., R.A.F., No. 105 Sqn.—This officer has completed a very large number of operational missions, including many attacks on targets in the Ruhr area. He has set the finest example of courage and resolution in pressing home his attacks, often in the face of fierce enemy fire, making his bombing runs with great steadiness and accuracy. This officer has rendered much valuable and devoted service.

Act. Sqn. Ldr. E. J. SAUNDERS, D.F.C., R.A.F.V.R., No. 128 Sqn., and Act. Sqn. Ldr. R. G. St. C. WADSWORTH, D.F.C., R.A.F.V.R., No. 692 Sqn.—These members of aircraft crew have completed very many sorties against enemy targets. In January, 1945, they were detailed for an operation which necessitated releasing heavy bombs from low level at the openings to various tunnels on the enemy's railway system leading to the Western front. The mission called for a high degree of skill. The good results obtained reflects the greatest credit on the efforts of the personnel mentioned, who throughout a dangerous and difficult sortie displayed exceptional ability, great determination and devotion to duty.

Second Bar to Distinguished Flying Cross

Act. Sqn. Ldr. I. G. BROOM, D.F.C., R.A.F.V.R., No. 128 Sqn.—For citation see Act. Sqn. Ldr. E. J. Saunders, D.S.O., D.F.C.

Bar to Distinguished Flying Cross

Act. Sqn. Ldr. L. W. N. BOOTH, D.F.C., R.A.F.V.R., No. 582 Sqn.—Since the award of the D.F.C., Sqn. Ldr. Booth has completed many more sorties, and has continued to display an inspiring keenness to engage the enemy. He has set a fine example as squadron gunnery leader at all times.

Act. Sqn. Ldr. J. N. S. CUMMING, D.F.C., R.A.F., No. 109 Sqn.—Throughout his two tours of operations, Sqn. Ldr. Cumming has shown himself an outstanding pilot and deputy flight commander. Since the award of the D.F.C. he has completed a large number of operational missions against heavily defended targets in Germany and enemy-occupied territory. He has always displayed the utmost enthusiasm and courage which, combined with his fine leadership and determination, have been worthy of high praise.

Flt. Lt. M. R. ASHMAN, D.F.C., R.A.F.V.R., No. 582 Sqn.—This officer has participated in numerous sorties against heavily defended targets in Germany and enemy-occupied territory. He has proved himself a keen and skilful navigator. His courage and fortitude in the face of all hazards, together with his consistent devotion to duty, merit high praise.

Flt. Lt. J. R. CASSELS, D.F.C., R.A.F.V.R., No. 139 Sqn.—Flt. Lt. Cassels has completed many sorties since the award of the D.F.C. All of them have been flown against targets in Germany. He has proved himself a most skilful and courageous pilot. His outstanding ability to make quick decisions in the most arduous circumstances, together with his tenacity of purpose and eager enthusiasm, have set an excellent example to all pilots.

Flt. Lt. R. B. CASTLE, D.F.C., R.A.F.V.R., No. 105 Sqn.—This officer has proved himself to be a skilful and courageous pilot. Since the award of the D.F.C. he has completed a large number of operational sorties, including many attacks against heavily defended targets in the Ruhr Valley. His cool determination to press home his attacks despite the most adverse circumstances, combined with his unfailing judgment, has played a large part in the successful completion of many missions.

Flt. Lt. B. J. DOBSON, D.F.C., R.A.F.V.R., No. 44 Sqn.—This officer has completed a successful operational tour. In addition to many bombing sorties against vital targets, he has participated in hazardous mine-laying missions with outstanding skill and determination. Since the award of the D.F.C. he has completed further missions. Throughout all his operations he has continued to set a fine example of tenacity and devotion to duty which have earned for him the admiration of all his squadron.

Flt. Lt. F. M. H. FISHER, D.F.C., R.A.F.V.R., No. 49 Sqn.—Throughout two tours of operations Flt. Lt. Fisher has consistently set a praiseworthy example of skill, determination and courage. He has participated in many attacks against most heavily defended targets, often flying in adverse weather. He has also rendered valuable assistance to his section leader in helping to train inexperienced air gunners.

Flt. Lt. T. C. GRAHAM, D.F.C., R.A.F.V.R., No. 109 Sqn.—Since the award of the D.F.C. this officer has completed a very large number of operational missions which have necessitated a high standard of navigational skill and determination. He has at all times set a gallant example of enthusiasm, courage and devotion to duty.

Flt. Lt. J. J. HUNTER, D.F.C., R.A.F.V.R., No. 105 Sqn.—Flt. Lt. Hunter has participated in numerous further sorties since the award of the D.F.C. He has flown on many arduous missions and has consistently shown great courage in the face of danger, outstanding navigational skill and determination which have merited high commendation.

Flt. Lt. G. E. LOWE, D.F.C., R.A.F.V.R., No. 10 Sqn.—This officer has taken part in attacks against some of the most heavily defended targets in Germany. He has at all times displayed a splendid fighting spirit which, together with his outstanding skill and unfailing vigilance, have played a large part in the successful completion of many missions. During a sortie to Berlin in February, 1944, Flt. Lt. Lowe sighted a Focke Wulf 190 at 700 yards range. By his accurate fire he damaged the enemy fighter. On another occasion in April, 1944, his aircraft was attacked by a Junkers 88. This officer promptly passed accurate information to his captain and fired on the enemy aircraft, which dived down out of control and was probably destroyed. Flt. Lt. Lowe is also an excellent gunnery leader whose splendid example has done much to raise and maintain the standard of gunnery throughout the squadron.

Flt. Lt. A. O'HARA, D.F.C., D.F.M., R.A.F.V.R., No. 109 Sqn.—This officer has completed two tours of duty during which he has operated with outstanding skill and enthusiasm. Since the award of the D.F.C. he has participated in many further sorties. Despite all hazards, he has continued to display high courage and unfailing determination which have been most praiseworthy.

Flt. Lt. F. C. PETTS, D.F.C., R.A.F., No. 109 Sqn.—Since the award of the D.F.C. this officer has continued to operate with courage and devotion to duty of a high order. He has completed a large number of missions against strongly defended targets and has always pressed home his attacks with vigorous determination. He has also successfully participated in other sorties which have necessitated great skill and accuracy. His magnificent airmanship has won the admiration of all his squadron.

Act. Flt. Lt. R. L. C. LASHAM, D.F.C., R.A.F.V.R., No. 97 Sqn.—Flt. Lt. Lasham has, since the award of the D.F.C., completed numerous further sorties with the utmost success. During August and September, 1944, this officer played a large part in the successful completion of many missions against heavily defended German targets. On several occasions his aircraft has been damaged by heavy anti-aircraft fire, but his enthusiasm for operational duty has never flagged. On all occasions, Flt. Lt. Lasham has displayed the greatest determination to locate the allotted target and he has achieved conspicuous success.

Act. Sqn. Ldr. A. W. G. COCHRANE, D.S.O., D.F.C., R.N.Z.A.F., No. 156 Sqn.—Sqn. Ldr. Cochrane is a cool and courageous captain and pilot, whose fine qualities of leadership and determination have been well illustrated in many operations against the enemy. In December, 1944, Sqn. Ldr. Cochrane participated in an attack on the airfield at Dusseldorf. In spite of intense and accurate fire from the ground defences, Sqn. Ldr. Cochrane pressed home his attack with his usual skill. His aircraft was hit, but he flew it back to base. His devotion to duty has been unfailing.

Act. Flt. Lt. T. J. BROOM, D.F.C., R.A.F., No. 128 Sqn.—For citation see Act. Sqn. Ldr. E. J. Saunders, D.S.O., D.F.C.

Distinguished Flying Cross

Wing Cdr. R. J. BURROUGH, R.A.F., No. 128 Sqn.—For citation see Act. Sqn. Ldr. E. J. Saunders, D.S.O., D.F.C.

Act. Sqn. Ldr. H. D. DAWLISH, R.A.F.O., No. 571 Sqn.—For citation see Act. Sqn. Ldr. E. J. Saunders, D.S.O., D.F.C.

Flt. Lt. C. H. BUBBIDGE, R.A.F.V.R., No. 692 Sqn.—For citation see Act. Sqn. Ldr. E. J. Saunders, D.S.O., D.F.C.

Flt. Lt. G. C. CROW, R.A.F.V.R., No. 692 Sqn.—For citation see Act. Sqn. Ldr. E. J. Saunders, D.S.O., D.F.C.

Flt. Lt. T. H. GALLOWAY, D.F.M., R.A.F.V.R., No. 692 Sqn.—For citation see Act. Sqn. Ldr. E. J. Saunders, D.S.O., D.F.C.

Flt. Lt. N. J. GRIFFITHS, R.A.F., No. 571 Sqn.—For citation see Act. Sqn. Ldr. E. J. Saunders, D.S.O. D.F.C

Flt. Lt. H. H. TATTERSALL, R.A.F.V.R., No. 571 Sqn.—For citation see Act. Sqn. Ldr. E. J. Saunders, D.S.O., D.F.C.

F/O. C. E. EARL, R.A.F.V.R., No. 692 Sqn.—For citation see Act. Sqn. Ldr. E. J. Saunders, D.S.O., D.F.C.

F/O. A. W. ROBINSON, R.A.F.V.R., No. 128 Sqn.—For citation see Act. Sqn. Ldr. E. J. Saunders, D.S.O., D.F.C.

P/O. D. R. TUCKER, R.A.F.V.R., No. 571 Sqn.—For citation see Act. Sqn. Ldr. E. J. Saunders, D.S.O., D.F.C.

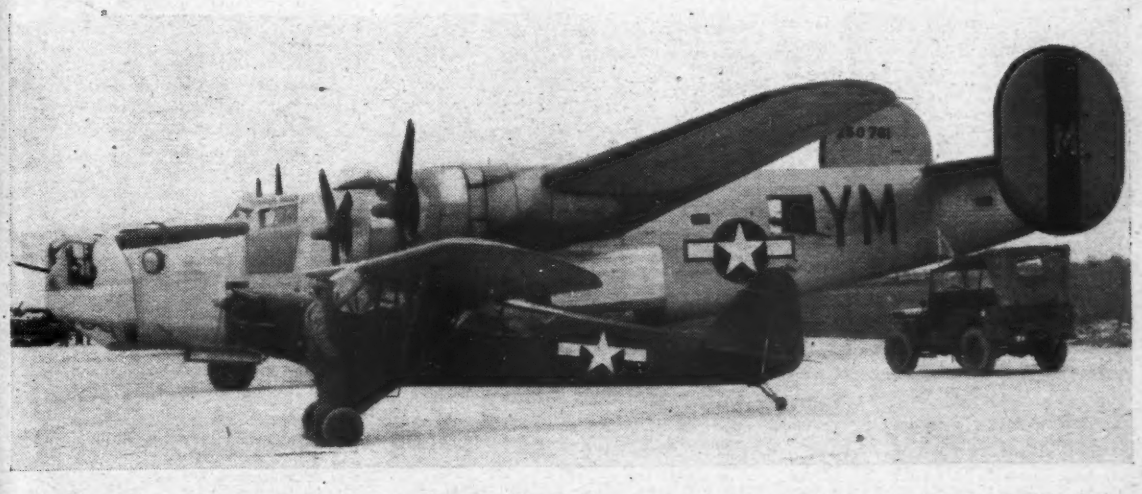
Act. Sqn. Ldr. K. L. COLLINSON, R.A.F.V.R., No. 166 Sqn.

Flt. Lt. J. J. STALBERGER, R.C.A.F., No. 424 (R.C.A.F.) Sqn.

Act. Flt. Lt. N. D. MARA, R.C.A.F., No. 433 (R.C.A.F.) Sqn.

F/O. R. J. AUDET, R.C.A.F. No. 411 (R.C.A.F.) Sqn.

F/O. J. R. H. LAFRENIERE, R.C.A.F., No. 425 (R.C.A.F.) Sqn



L-4 AND B-24J: Two extremes of American operational aircraft, seen on an emergency landing strip. The length of the Piper Cub is 22ft. 6in., and that of the Liberator 67ft. 2in.

EARLY RISERS: Five Spitfire pilots who destroyed five enemy aircraft before breakfast while on an offensive sweep.

F/O. S. B. LINDSAY, R.C.A.F., No. 419 (R.C.A.F.) Sqn.
F/O. A. HAGUES, R.A.F.V.R., No. 608 Sqn.
F/O. K. W. HALL, R.A.F.V.R., No. 514 Sqn.
F/O. G. H. G. HARRIS, R.A.F.V.R., No. 101 Sqn.
F/O. B. HASLAM, R.A.F.V.R., No. 514 Sqn.
F/O. D. S. JONES, R.A.F.V.R., No. 101 Sqn.
F/O. J. G. LEE, R.A.F.V.R., No. 10 Sqn.
F/O. G. P. MARKHAM, R.A.F.V.R., No. 51 Sqn.
F/O. A. MARSHALL, R.A.F.V.R., No. 7 Sqn.
F/O. P. MCNEE, R.A.F.V.R., No. 102 Sqn.
F/O. W. J. MEPHAM, R.A.F.V.R., No. 692 Sqn.
F/O. A. R. MORRIS, R.A.F.V.R., No. 608 Sqn.
F/O. W. S. M. NASH, R.A.F., No. 619 Sqn.
F/O. M. B. NICOL, R.A.F.V.R., No. 51 Sqn.
F/O. R. NICHOLSON, R.A.F.V.R., No. 35 Sqn.
F/O. E. NOBLE, R.A.F.V.R., No. 460 (R.A.A.F.) Sqn.
F/O. H. S. L. T. NORCROSS, R.A.F.V.R., No. 218 Sqn.
F/O. G. NORTON, R.A.F.V.R., No. 77 Sqn.
F/O. H. E. PALMER, R.A.F.V.R., No. 207 Sqn.
F/O. R. S. PARISH, R.A.F.V.R., No. 582 Sqn.
F/O. J. G. RAMSDEN, R.A.F.V.R., No. 635 Sqn.
F/O. D. A. RICHARDS, R.A.F.V.R., No. 78 Sqn.
F/O. E. B. ROBERTS, R.A.F.V.R., No. 10 Sqn.
F/O. J. ROBERTSHAW, R.A.F.V.R., No. 462 (R.A.A.F.) Sqn.
F/O. B. J. ROCK, R.A.F.V.R., No. 7 Sqn.
F/O. H. A. W. RUMBELOW, R.A.F.V.R., No 576 Sqn.
F/O. A. E. RYDER, R.A.F.V.R., No. 97 Sqn.
F/O. J. C. SAMPSON, R.A.F.V.R., No. 105 Sqn.
F/O. S. F. SHORNEY, R.A.F.V.R., No. 12 Sqn.
F/O. J. SLATER, R.A.F.V.R., No. 44 Sqn.
F/O. F. D. SMITH, R.A.F.V.R., No. 192 Sqn.
F/O. I. G. SMITH, R.A.F.V.R., No. 100 Sqn.
F/O. E. SOUTHALL, R.A.F.V.R.
F/O. W. A. STOCKER, R.A.F.V.R., No. 51 Sqn.
F/O. G. MCK. SUTTIE, R.A.F.V.R., No. 635 Sqn.
F/O. A. L. WEBSTER, R.A.F.V.R., No. 78 Sqn.
F/O. R. C. WHITE, R.A.F.V.R., No. 7 Sqn.
F/O. C. E. WILLIAMS, R.A.F.V.R., No. 514 Sqn.
F/O. A. H. WOOD, R.A.F.V.R., No. 626 Sqn.
F/O. F. A. WORCESTER, R.A.F.V.R., No. 23 Sqn.
F/O. R. H. YOUNGMAN, R.A.F.V.R.
Act. F/O. R. G. BOSWELL, R.A.F.V.R., No. 44 Sqn.
Act. F/O. A. BRUCE, R.A.F.V.R., No. 10 Sqn.
Act. F/O. J. M. BUCHAN, R.A.F.V.R., No. 12 Sqn.
Act. F/O. M. J. FINLAY, R.A.F.V.R., No. 582 Sqn.
Act. F/O. R. HARDWICK, R.A.F.V.R., No. 514 Sqn.
Act. F/O. J. W. G. HODGKINSON, R.A.F.V.R., No. 207 Sqn.
Act. F/O. F. G. JAMES, R.A.F.V.R., No. 101 Sqn.
Act. F/O. J. MACDONALD, R.A.F., No. 576 Sqn.
Act. F/O. J. A. MCCOLLAH, R.A.F.V.R., No. 7 Sqn.
Act. F/O. S. H. SPENCER, R.A.F.V.R. No 640 Sqn.
Act. F/O. J. H. F. WHITE, R.A.F.V.R., No. 153 Sqn.
Act. F/O. J. A. WHITWOOD, R.A.F.V.R., No. 514 Sqn.
P/O. J. T. ADAIR, R.A.F.V.R., No. 9 Sqn.
P/O. J. W. ADAMS, R.A.F.V.R., No. 571 Sqn.
P/O. K. F. ANDERSON, R.A.F.V.R., No. 158 Sqn.
P/O. R. H. ALLEN, R.A.F.V.R., No. 582 Sqn.
P/O. A. B. ARNOLD, R.A.F.V.R., No. 582 Sqn.
P/O. J. M. AVLIEFF, R.A.F.V.R., No. 78 Sqn.
P/O. C. O. BEADMAN, R.A.F.V.R., No. 405 (R.C.A.F.) Sqn.
P/O. L. C. BELLINGER, R.A.F.V.R., No. 582 Sqn.
P/O. J. R. BURRETT, R.A.F.V.R., No. 15 Sqn.
P/O. F. H. P. CLEAR, R.A.F.V.R., No. 7 Sqn.
P/O. F. M. CONNOLLY, R.A.F.V.R., No. 214 Sqn.
P/O. A. F. CRISP, R.A.F.V.R., No. 149 Sqn.
P/O. W. G. CROOKS, R.A.F.V.R., No 692 Sqn.
P/O. R. V. DICKESON, R.A.F.V.R., No. 156 Sqn.
P/O. E. N. DISHART, R.A.F.V.R., No. 576 Sqn.
P/O. A. A. EDWARDS, R.A.F.V.R., No. 102 Sqn.
P/O. S. J. ELLIS, R.A.F.V.R., No. 102 Sqn.
P/O. S. FORSYTH, R.A.F.V.R., No 192 Sqn.
P/O. S. R. FROST, R.A.F.V.R., No. 640 Sqn.
P/O. G. B. GRAHAM, R.A.F.V.R., No. 578 Sqn.
P/O. C. GRAINGER, R.A.F.V.R., No. 51 Sqn.
P/O. J. S. GRAY, R.A.F.V.R., No. 51 Sqn.
P/O. A. DE L. GREIG, R.A.F., No. 576 Sqn.
P/O. E. G. GODDEN, R.A.F.V.R., No. 77 Sqn.
P/O. P. GOLDSMID, R.A.F.V.R., No. 578 Sqn.
P/O. N. G. HARRIS, R.A.F., No. 578 Sqn.
P/O. J. A. HETHERINGTON, R.A.F.V.R., No. 578 Sqn.
P/O. R. G. HEUSTON, R.A.F.V.R., No. 578 Sqn.
P/O. G. D. W. HODGSON, R.A.F.V.R., No. 578 Sqn.
P/O. G. J. HOWATSON, R.A.F.V.R., No. 578 Sqn.
P/O. H. G. HUDSON, R.A.F.V.R., No. 7 Sqn.
P/O. K. W. HUNT, R.A.F.V.R., No. 640 Sqn.
P/O. T. H. D. JONES, R.A.F.V.R., No. 158 Sqn.
P/O. M. KELLY, R.A.F.V.R., No. 90 Sqn.
P/O. C. S. A. KELLY, R.A.F.V.R., No. 78 Sqn.
P/O. G. B. KING, R.A.F.V.R., No. 78 Sqn.
P/O. J. H. LENAGHAN, R.A.F.V.R., No. 7 Sqn.
P/O. L. H. MCNAMARA, R.A.F.V.R., No. 158 Sqn.
P/O. B. A. MAJAKI (since deceased), R.A.F.V.R., No. 578 Sqn.
P/O. R. B. MALCOLM, R.A.F.V.R., No. 78 Sqn.
P/O. D. F. W. MANSFIELD, R.A.F.V.R., No. 578 Sqn.
P/O. D. C. MARSH, R.A.F.V.R., No. 149 Sqn.
P/O. F. MARSHALL, R.A.F.V.R., No. 7 Sqn.
P/O. K. W. MARSHALL, R.A.F.V.R., No. 578 Sqn.
P/O. D. W. E. MAY, R.A.F.V.R., No. 158 Sqn.
P/O. G. MILLER, R.A.F.V.R., No. 49 Sqn.
P/O. A. E. NAPPER, R.A.F.V.R., No. 625 Sqn.
P/O. J. S. OLIVER, R.A.F.V.R., No. 57 Sqn.
P/O. H. F. C. PARSONS, R.A.F.V.R., No. 9 Sqn.
P/O. R. G. PITTS, R.A.F.V.R., No. 102 Sqn.
P/O. I. POWELL, R.A.F.V.R., No. 158 Sqn.
P/O. C. L. PYLE, R.A.F.V.R., No. 101 Sqn.
P/O. T. A. RIPPON, R.A.F.V.R., No. 35 Sqn.
P/O. L. T. SANDERS, R.A.F.V.R., No. 462 (R.A.A.F.) Sqn.
P/O. A. J. SHORTER, R.A.F.V.R., No. 158 Sqn.
P/O. K. P. SIBBONS, R.A.F.V.R., No. 78 Sqn.
P/O. J. H. STENHOUSE, R.A.F.V.R., No. 101 Sqn.
P/O. W. A. STONEHAM, R.A.F.V.R., No. 7 Sqn.
P/O. G. W. THOMAS, R.A.F.V.R., No. 102 Sqn.
P/O. P. E. TOVEY, R.A.F.V.R., No. 582 Sqn.
P/O. E. J. E. TREVALLION, R.A.F.V.R., No. 578 Sqn.
P/O. J. R. VOSE, R.A.F.V.R., No. 578 Sqn.
P/O. J. H. WHEATLEY, R.A.F.V.R., No. 78 Sqn.
P/O. W. D. WILLIAMS, R.A.F.V.R., No. 582 Sqn.
P/O. G. A. WOOD, R.A.F.V.R., No. 78 Sqn.
P/O. G. A. J. WOTHERSPOON, R.A.F.V.R., No. 10 Sqn.
P/O. R. C. YOUNG, R.A.F.V.R., No. 578 Sqn.
W/O. T. H. BARNES, R.A.F.V.R., No. 640 Sqn.
W/O. T. R. BARR, R.A.F.V.R., No. 23 Sqn.
W/O. A. E. DENHAM, R.A.F.V.R., No. 7 Sqn.
W/O. A. EVEREST, R.A.F.V.R., No. 186 Sqn.
W/O. J. P. GREGORY, R.A.F.V.R., No. 582 Sqn.
W/O. R. T. HEMMING, R.A.F.V.R., No. 571 Sqn.
W/O. G. A. KNAPP, R.A.F., No. 35 Sqn.
W/O. J. F. MARTIN, R.A.F.V.R., No. 199 Sqn.
W/O. W. PRICE, R.A.F., No. 405 (R.C.A.F.) Sqn.
W/O. C. RATCLIFF, R.A.F., No. 582 Sqn.
W/O. H. A. RUDD, R.A.F.V.R., No. 635 Sqn.
Act. W/O. A. C. ASTON, R.A.F.V.R., No 35 Sqn.
Act. W/O. G. I. BATHO, R.A.F.V.R., No. 97 Sqn.
Act. W/O. H. R. HART, R.A.F.V.R., No. 405 (R.C.A.F.) Sqn.
F/O. P. W. TATHAM, R.A.A.F., No. 90 Sqn.
F/O. R. H. THOMSON, R.A.A.F., No. 625 Sqn.
F/O. H. J. TREVENEN, R.A.A.F., No. 78 Sqn.
F/O. P. D. WILSON, R.A.A.F., No. 462 (R.A.A.F.) Sqn.
Act. F/O. K. G. GROVES, R.A.A.F., No. 153 Sqn.
Act. F/O. D. M. HUGHES, R.A.A.F., No. 467 (R.A.A.F.) Sqn.
Act. F/O. C. P. MCCOY, R.A.A.F., No. 460 (R.A.A.F.) Sqn.
Act. F/O. H. A. MOORE, R.A.A.F., No. 51 Sqn.
Act. F/O. J. THOMSON, R.A.A.F., No. 100 Sqn.
Act. F/O. J. H. WAXMAN, R.A.A.F., No. 466 (R.A.A.F.) Sqn.

SERVICE

P/O. C. R. ALCOCK, R.A.A.F., No. 156 Sqn.
P/O. T. G. BUNCE, R.A.A.F., No. 7 Sqn.
P/O. R. C. ELLIOTT, R.A.A.F., No. 158 Sqn.
P/O. D. J. FEATHERSTONE, R.A.A.F., No. 90 Sqn.
P/O. C. FISHER, R.A.A.F., No. 78 Sqn.
P/O. F. E. HUGHES, R.A.A.F., No. 97 Sqn.
P/O. O. J. JOHNSON, R.A.A.F., No. 578 Sqn.
P/O. J. A. G. LARTER, R.A.A.F., No. 460 (R.A.A.F.) Sqn.
P/O. R. J. LONGWORTH, R.A.A.F., No. 571 Sqn.
P/O. K. A. LODGE, R.A.A.F., No. 158 Sqn.
P/O. A. C. MARSHALL, R.A.A.F., No. 578 Sqn.
P/O. R. L. MERRILL, R.A.A.F., No. 218 Sqn.
P/O. P. NOONAN, R.A.A.F., No. 578 Sqn.
P/O. B. E. J. O'LEARY, R.A.A.F., No. 460 (R.A.A.F.) Sqn.
P/O. H. W. TINNING, R.A.A.F., No. 51 Sqn.
P/O. R. T. WILLIAMS, R.A.A.F., No. 625 Sqn.
W/O. H. C. GEDDES, R.A.A.F., No. 405 (R.A.A.F.) Sqn.
W/O. E. A. NORMAN, R.A.A.F., No. 460 (R.A.A.F.) Sqn.
W/O. W. T. QUIRKE, R.A.A.F., No. 35 Sqn.
F/O. M. S. KRAKOWSKY, R.C.A.F., No. 432 (R.C.A.F.) Sqn.
F/O. R. A. LAMONT, R.C.A.F., No. 100 Sqn.
F/O. M. LANIN, R.C.A.F., No. 429 (R.C.A.F.) Sqn.
F/O. C. J. LAROUCHE, R.C.A.F., No. 78 Sqn.
F/O. J. LASEK, R.C.A.F., No. 429 (R.C.A.F.) Sqn.
F/O. L. E. LAVALLEY, R.C.A.F., No. 10 Sqn.
F/O. L. E. LOCKE, R.C.A.F., No. 434 (R.C.A.F.) Sqn.
F/O. E. LOWNDS, R.C.A.F., No. 78 Sqn.
F/O. M. C. MACFARLANE, R.C.A.F., No. 61 Sqn.
F/O. R. W. MCBURNEY, R.C.A.F., No. 427 (R.C.A.F.) Sqn.
F/O. G. W. E. MCELROY, R.C.A.F., No. 78 Sqn.
F/O. B. D. MCEWAN, R.C.A.F., No. 128 Sqn.
F/O. W. J. MCINTYRE, R.C.A.F., No. 434 (R.C.A.F.) Sqn.
F/O. D. D. MCNEILL, R.C.A.F., No. 415 (R.C.A.F.) Sqn.
F/O. W. C. MATTEN, R.C.A.F., No. 166 Sqn.
F/O. J. MUNN, R.C.A.F. No. 578 Sqn.
F/O. R. L. NELSON, R.C.A.F., No. 78 Sqn.
F/O. S. R. NOBLE, R.C.A.F., No. 428 (R.C.A.F.) Sqn.
F/O. J. W. O'DRISCOLL, R.C.A.F., No. 166 Sqn.
F/O. C. H. PARKER, R.C.A.F., No. 78 Sqn.
F/O. G. D. PAYNE, R.C.A.F., No. 35 Sqn.
F/O. J. R. POSTE, R.C.A.F., No. 431 (R.C.A.F.) Sqn.
F/O. H. G. PAUL, R.C.A.F., No. 78 Sqn.
F/O. F. L. RAY, R.C.A.F., No. 427 (R.C.A.F.) Sqn.
F/O. A. T. RICHARDSON, R.C.A.F., No. 428 (R.C.A.F.) Sqn.
F/O. T. R. RODEN, R.C.A.F., No. 432 (R.C.A.F.) Sqn.
F/O. P. D. ROY, R.C.A.F., No. 415 (R.C.A.F.) Sqn.
F/O. C. W. SCHULTZ, R.C.A.F., No. 77 Sqn.
F/O. H. G. SHARP, R.C.A.F., No. 7 Sqn.
F/O. L. J. SMALL, R.C.A.F., No. 405 (R.C.A.F.) Sqn.
F/O. D. L. SNIDER, R.C.A.F., No. 408 (R.C.A.F.) Sqn.
F/O. H. SOLOMOS, R.C.A.F., No. 433 (R.C.A.F.) Sqn.
F/O. H. G. SPEIGHT, R.C.A.F., No. 419 (R.C.A.F.) Sqn.
F/O. P. C. STEMKOSKI, R.C.A.F., No. 158 Sqn.
F/O. R. L. STEVENSON, R.C.A.F., No. 625 Sqn.
F/O. C. M. STEWART, R.C.A.F., No. 420 (R.C.A.F.) Sqn.
F/O. B. TAYLOR, R.C.A.F., No. 192 Sqn.
F/O. J. TITE, R.C.A.F., No. 405 (R.C.A.F.) Sqn.
F/O. R. H. ELLIOTT, R.A.F.V.R., No. 578 Sqn.
F/O. J. W. ERRICKER, R.A.F.V.R., No. 78 Sqn.
F/O. D. R. FELLOWS, R.A.F.V.R., No. 158 Sqn.
F/O. A. C. P. GAMBLE, R.A.F.V.R., No. 103 Sqn.
F/O. L. GRANT, R.A.F.V.R., No. 186 Sqn.
F/O. J. H. GRIBBON, R.A.F.V.R., No. 427 (R.C.A.F.) Sqn.
Act. Sqn. Ldr. K. EDDY, R.A.A.F., No. 171 Sqn.
Flt. Lt. F. O. CAMBRIDGE, R.A.A.F., No. 463 (R.A.A.F.) Sqn.
Flt. Lt. A. R. MARRIOTT, R.A.A.F., No. 35 Sqn.
Act. Flt. Lt. R. R. ANDERSON, R.A.A.F., No. 460 (R.A.A.F.) Sqn.
Act. Flt. Lt. E. A. CATTELL, R.A.A.F., No. 171 Sqn.
Act. Flt. Lt. A. R. EWENS, R.A.A.F., No. 156 Sqn.
Act. Flt. Lt. R. R. HICKEY, R.A.A.F., No. 462 (R.A.A.F.) Sqn.
Act. Flt. Lt. J. L. G. MARSHALL, R.A.A.F., No. 35 Sqn.
Act. Flt. Lt. W. K. PERRY, R.A.A.F., No. 15 Sqn.
Act. Flt. Lt. V. L. SCANTLETON, R.A.A.F., No. 214 Sqn.
Act. Flt. Lt. T. N. SCHOLEFIELD, R.A.A.F., No. 97 Sqn.
Act. Flt. Lt. J. E. WADE, R.A.A.F., No. 466 (R.A.A.F.) Sqn.
Act. Flt. Lt. D. R. WARD, R.A.A.F., No. 625 Sqn.
Act. Flt. Lt. C. R. YOUNG, R.A.A.F., No. 218 Sqn.
F/O. B. H. BEAUMONT, R.A.A.F., No. 460 (R.A.A.F.) Sqn.
F/O. L. A. BURN, R.A.A.F., No. 467 (R.A.A.F.) Sqn.
F/O. I. R. COWAN, R.A.A.F., No. 467 (R.A.A.F.) Sqn.
F/O. S. J. DAVEY, R.A.A.F., No. 460 (R.A.A.F.) Sqn.
F/O. R. G. FAIRLIE, R.A.A.F., No. 103 Sqn.
F/O. E. G. FERRIDAY, R.A.A.F., No. 101 Sqn.
F/O. J. L. HAGER, R.A.A.F., No. 617 Sqn.
F/O. J. N. HARVEY, R.A.A.F., No. 625 Sqn.
F/O. H. HASSLES, R.A.A.F., No. 100 Sqn.
F/O. V. C. HAWKER, R.A.A.F., No. 101 Sqn.
F/O. K. S. JEWELL, R.A.A.F., No. 617 Sqn.
F/O. A. E. LENEHAN, R.A.A.F., No. 100 Sqn.

F/O. R. R. VOGAN, R.C.A.F., No. 408 (R.C.A.F.) Sqn.
F/O. J. D. WALKER, R.C.A.F., No. 101 Sqn.
F/O. J. G. WHEELER, R.C.A.F., No. 429 (R.C.A.F.) Sqn.
F/O. D. S. WILKINSON, R.C.A.F., No. 460 (R.C.A.F.) Sqn.
F/O. L. D. WILLIAMS, R.C.A.F., No. 460 (R.C.A.F.) Sqn.
F/O. P. A. WOOD, R.C.A.F., No. 78 Sqn.
F/O. J. Y. H. YOUNG, R.C.A.F., No. 149 Sqn.
Act. F/O. W. L. COOK, R.C.A.F., No. 626 Squ.
Act. F/O. A. HUTCHEON, R.C.A.F., No. 425 (R.C.A.F.) Sqn.
Act. F/O. D. O. MCTAGGART, R.C.A.F., No. 415 (R.C.A.F.) Sqn.
Act. F/O. L. M. MOSSMAN, R.C.A.F., No. 428 (R.C.A.F.) Sqn.
Act. F/O. E. M. REESOR, R.C.A.F., No. 431 (R.C.A.F.) Sqn.
Act. F/O. W. J. SIMPSON, R.C.A.F., No. 101 Sqn.
Act. F/O. H. M. SMITH, R.C.A.F., No. 428 (R.C.A.F.) Sqn.
Act. F/O. J. E. THOMPSON, R.C.A.F., No. 12 Sqn.
P/O. D. BARBOUR, R.C.A.F., No. 78 Sqn.
P/O. P. R. BROWN, R.C.A.F., No. 419 (R.C.A.F.) Sqn.
P/O. M. W. COLE, R.C.A.F., No. 432 (R.C.A.F.) Sqn.
P/O. A. L. DAY, R.C.A.F., No. 582 Sqn.
P/O. L. R. G. DENT, R.C.A.F., No. 433 (R.C.A.F.) Sqn.
P/O. D. E. GIRLING, R.C.A.F., No. 101 Sqn.
P/O. R. G. HARLOW, R.C.A.F., No. 403 (R.C.A.F.) Sqn.
P/O. R. C. HARVEY, R.C.A.F., No. 408 (R.C.A.F.) Sqn.
P/O. R. H. HINDS, R.C.A.F., No. 101 Sqn.
P/O. J. L. KESLICK, R.C.A.F., No. 429 (R.C.A.F.) Sqn.
P/O. W. A. KIRSTUIK, R.C.A.F., No. 424 (R.C.A.F.) Sqn.
P/O. R. C. F. LUCKHART, R.C.A.F., No. 640 Sqn.
P/O. J. F. MAGNUSSON, R.C.A.F., No. 431 (R.C.A.F.) Sqn.
P/O. J. MALEC, R.C.A.F., No. 424 (R.C.A.F.) Sqn.
P/O. L. W. MCPHIE, R.C.A.F., No. 424 (R.C.A.F.) Sqn.
P/O. J. F. PALEN, R.C.A.F., No. 635 Sqn.
P/O. A. C. PITZEK, R.C.A.F., No. 431 (R.C.A.F.) Sqn.
P/O. P. R. PUE, R.C.A.F., No. 429 (R.C.A.F.) Sqn.
P/O. J. C. SULLIVAN, R.C.A.F., No. 12 Sqn.
P/O. J. R. SUTHERLAND, R.C.A.F., No. 158 Sqn.
P/O. W. E. VINE, R.C.A.F., No. 405 (R.C.A.F.) Sqn.
W/O. A. LYON, R.C.A.F., No. 214 Sqn.
W/O.1 A. T. SMITH, R.C.A.F., No. 433 (R.C.A.F.) Sqn.
F/O. H. C. HURT, R.N.Z.A.F., No. 15 Sqn.
F/O. B. E. SMITH, R.N.Z.A.F., No. 103 Sqn.
Act. F/O. M. R. BLANK, R.N.Z.A.F., No. 57 Sqn.
Act. F/O. L. O. EDWARDS, R.N.Z.A.F., No. 149 Sqn.
P/O. N. K. BRABART, R.N.Z.A.F., No. 158 Sqn.
P/O. T. H. HILL, R.N.Z.A.F., No. 158 Sqn.
P/O S. A. THOMPSON, R.N.Z.A.F., No. 102 Sqn.

Distinguished Flying Medal

Flt. Sgt. R. C. PARKER, R.A.F., No. 7 Sqn.
Flt. Sgt. W. R. PEAKE, R.A.F.V.R., No. 138 Sqn.
Flt. Sgt. R. PERKINS, R.A.F.V.R., No. 35 Sqn.
Flt. Sgt. C. F. PRETLOVE, R.A.F.V.R., No. 156 Sqn.
Flt. Sgt. J. D. QUAGGIN, R.A.F.V.R., No. 578 Sqn.
Flt. Sgt. F. REED, R.A.F.V.R., No. 156 Sqn.
Flt. Sgt. J. F. REED, R.A.F.V.R., No. 7 Sqn.
Flt. Sgt. E. RIDOUT, R.A.F.V.R., No. 166 Sqn.
Flt. Sgt. W. S. RICHARDS, R.A.F.V.R., No. 97 Sqn.
Flt. Sgt. J. S. ROBERTSON, R.A.F.V.R.
Flt. Sgt. G. L. P. SAVILL, R.A.F.V.R., No. 115 Sqn.
Flt. Sgt. P. SCANNEL, R.A.F.V.R., No. 158 Sqn.
Flt. Sgt. E. SCHOLES, R.A.F.V.R., No. 12 Sqn.
Flt Sgt. J. R. SUTTON, R.A.F.V.R., No. 207 Sqn.
Flt. Sgt. O. O. SYLVESTRE, R.A.F.V.R., No. 15 Sqn
Flt. Sgt. P. B THOMPSON, R.A.F.V.R., No. 35 Sqn.
Flt. Sgt. W. TURMER, R.A.F.V.R., No. 115 Sqn.
Flt. Sgt. N. TURNER, R.A.F.V.R., No. 35 Sqn.
Flt. Sgt. P. R. TURNER, R.A.F.V.R., No. 97 Sqn.
Flt. Sgt. D. WALSH, R.A.F.V.R., No. 10 Sqn.
Flt. Sgt. J. H. R. WATSON, R.A.F.V.R., No. 156 Sqn.
Flt. Sgt. H. W. WILCOX, R.A.F.V.R., No. 35 Sqn.
Flt. Sgt. R. J. WILSON, R.A.F.V.R., No. 514 Sqn.
Flt. Sgt. W. YATES, R.A.F.V.R., No. 97 Sqn.
Act. Flt. Sgt. A. R. Y. WOOLER, R.A.F.V.R., No. 35 Sqn.
Sgt. W. R. BAXTER, R.A.F.V.R., No. 158 Sqn.
Sgt. L. A. CROSS, R.A.F.V.R., No. 578 Sqn.
Sgt. A. J. JORDAN, R.A.F.V.R., No. 101 Sqn.
Sgt. W. KNOX, R.A.F.V.R., No. 158 Sqn.
Sgt. T. G. MARSHALL, R.A.F.V.R., No. 101 Sqn.
Sgt. (now P/O.) A. G. MITCHELL, R.A.F.V.R., No. 90 Sqn.
Sgt. H. R. SINTON, R.A.F., No. 35 Sqn.
Sgt. T. C. WILLIAMSON, R.A.F.V.R., No. 51 Sqn
Flt. Sgt. (now P/O.) E. G. NILES, R.C.A.F., No. 420 (R.C.A.F.) Sqn.
Sgt. T. MacD. ROBERTSON, R.C.A.F., No. 415 (R.C.A.F.) Sqn.
Flt. Sgt. J. L. RAMAGE, R.A.F., No. 692 Sqn. —For citation see Act. Sqn Ldr. E. J. Saunders, D.S.O., D.F.C.

R.A.A.F. Awards

THE KING has been graciously pleased to approve the following awards in recognition of gallantry and devotion to duty in the execution of air operations against the Japanese:—

Bar to Distinguished Flying Cross

Sqn. Ldr. LESLIE DOUGLAS JACKSON, D.F.C.

Distinguished Flying Cross

Wing Cdr. T. R. PHILP.
Sqn. Ldr. C. W. LINDEMAN.
Act. Sqn. Ldr. D. R. LAWRENCE.
Flt. Lt. D. R. ATKINS.
Flt. Lt. N. C. E. BARR.
Flt. Lt. H. G. DALLISTON.
Flt. Lt. R. N. D. MILLER.
Flt. Lt. J. N. OLLIVIER.
Flt Lt. I. R. OLORENSHAW.
Flt. Lt. R. S. OSMENT.
Flt. Lt. E. W. SALKELD.
Flt. Lt. B. A. TITSHALL.
Flt. Lt. R. D. VANDERFIELD
Flt. Lt. F. A. WATCHORN.
Act. Flt. Lt. R. J. MARR.
Act. Flt. Lt. J. W. THOMPSON.
F/O. L. ASHTON.
F/O. W. A. BARR.
F/O. K. F. BOSS-WALKER.
F/O. N. S. FAIRBRIDGE.
F/O. J. HASELER.
F/O. J. K. LONGMUIR.
F/O. R. V. ROBERTS.
F/O. G. L. STEVENSON
P/O. S. A. IKIN.

Distinguished Flying Medal

Flt. Sgt. G. D. BAKER.
Flt. Sgt. M. J. BROWN.
Flt. Sgt. R. J. LILLYWHITE.
Flt. Sgt. R. J. H. MACLEAN.
Flt. Sgt. C. S. NORMAN.
Flt. Sgt. B. P. TURNER.
Act. Sgt. V. W. CAMERON.

THE KING has been graciously pleased, on the advice of His Majesty's Australian Ministers, to approve the following awards in recognition of conspicuous service in operations against the Japanese:—

O.B.E. (Mil.)

Wing Cdr. H. W. PORTEOUS, R.A.A.F.
Act. Wing Cdr. G. D. B. MAUNDER, R.A.A.F.
Flt. Lt. J. R. HUBBARD, R.A.A.F.
Flt. Lt. T. S. YOUNG, R.A.A.F.
Flt Lt. W. G. G. BROWN, R.A.A.F.
Act. Flt. Lt. W. W. HAMMOND, R.A.A.F.
W/O. G. H. MOODY, R.A.A.F.

THE KING has been graciously pleased, on the advice of His Majesty's Australian Ministers, to approve the following awards in recognition of brave conduct:—

B.E.M. (Mil.)

Sgt. H. A. A. ZANDER, R.A.A.F.
Act. Sgt. G. E. HAMPTON, R.A.A.F.
Cpl. E. BRACKIN, R.A.A.F.
Cpl. J. J. DEAKE R.A.A.F.
L.A/C. T. E. W. TURTON, R.A.A.F.

Air-Sea Rescue Awards

THE KING has been graciously pleased to approve the following awards:—

Distinguished Service Cross

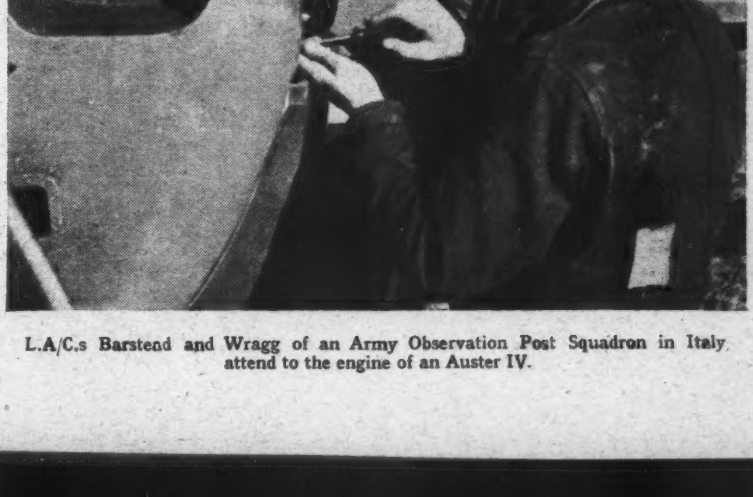
Act. Sqn. Ldr. E. A. HAINES, R.A.F.V.R.
Act. Flt. Lt. E. R. H. WATSON, R.A.F.V.R.
F/O. G. LOCKWOOD, R.A.F.V.R.

THE KING has been graciously pleased to approve the following awards:—

O.B.E. (Mil.)

Flt. Lt. M. C. BUNTING, R.A.F.V.R.—Flt. Lt. Bunting was attached to a party which was detailed to make a hazardous reconnaissance on the west coast of Sumatra. Besides performing his task with skill and despatch, this officer set, at all times, an example of courage and cheerfulness, and on many occasions, when the physical endurance of the members of the party became severely tested, he went far beyond what his duty required of him. On one occasion he gave up his food to two of his companions, who were faced with possible starvation and, on reaching the pre-arranged rendezvous in an exhausted state, Flt. Lt. Bunting stood on a 74-hour watch. The mission brought back valuable information and the success achieved was largely due to the selfless devotion to duty displayed by this officer, whose efforts also contributed much to the saving of some of his comrades' lives.

Flt. Lt. R. C. DICKSON, R.A.F.V.R., No. 57 Sqn.—One afternoon in November, 1944, an aircraft landed from an operational sortie, but when it had proceeded some 600 yards up the runway, an explosion occurred and the aircraft burst into flames. Flt. Lt. Dickson, the medical officer of the unit, immediately hastened to the scene and, on arrival, found one member of the crew lying clear of the wreckage. After giving this airman a cursory examination, Flt. Lt. Dickson gave instructions for him to be removed to hospital immediately. By this time ammunition and pyrotechnics in the aircraft were exploding continuously. The petrol tanks were blazing furiously and liable to explode at any moment. Undeterred, Flt. Lt. Dickson went to the aircraft to help another member of the crew who was trapped in the burning geodetics, his boots being on fire. Displaying complete disregard for his own safety, Flt. Lt. Dickson tore away the geodetics with his bare hands, injuring himself in the process, and freed the airman whom he then dragged to safety. Flt. Lt. Dickson's courage and devotion to duty on this occasion undoubtedly saved two lives. He has at all times shown outstanding devotion to duty and has done much to maintain the morale of air crews and ground personnel during difficult periods.
Flt. Lt. J. M. H. JEWELL, R.A.F.O., No. 33 Sqn.
Act. Flt. Lt. E. Q. SEMPLE, R.C.A.F., No. 457 (R.C.A.F.) Sqn.
Act. Flt. Lt. A. J. P. FURNEAUX, R.A.F.V.R. — In September, 1944, a high-speed launch had just been refuelled and was lying alongside a jetty when a violent explosion occurred in the engine room. Much damage was caused; the engine room casing was blown off, both sides of the engine room were blown out and the fore end of the room was enveloped in flames. The launch commenced to flood rapidly. One member of the crew, who was in the engine room, sustained a compound fracture of the right thigh, and was pinned down by a large piece of timber. His injured leg was entangled in some electric wire and debris, and fire from the petrol, on top of the water, was spreading rapidly towards him. The craft had by this time assumed a list of some 20 degrees. Cpl. Berry, who had been blown over by the explosion, quickly realised the seriousness of the situation. Undeterred by the possibility of further explosions, he climbed down into the engine room in an endeavour to extricate his comrade. Finding that he was unable to do so unaided, Cpl. Berry went for assistance, and was quickly joined by Flt. Lt. Furneaux, who had been standing on the jetty at the time



L.A/C.s Barstead and Wragg of an Army Observation Post Squadron in Italy attend to the engine of an Auster IV.

SERVICE AVIATION

of the explosion. The two rescuers were able finally to extricate the injured airman from his apparently hopeless position, and, with the help of others, he was passed to safety. Within two minutes of the rescue the whole of the engine room was ablaze. The courage and initiative displayed by Flt. Lt. Furneaux and Cpl Berry in dangerous circumstances were worthy of high praise.

Act. W/O. P MAQUIRE, R.A.F., R.A.F. Regt.—During an air raid on a forward airfield one evening in October, 1944, an enemy bomb fell very close to a heavy motor vehicle, setting it on fire. The vehicle was laden with an emergency reserve supply of H.E. and A.P. ammunition. The light from the fire was very considerable and invited further attack by the enemy. In view of the danger to which the whole airfield was exposed it was decided that an attempt should be made to get the fire under control. Although the ammunition on the vehicle was continually exploding and the absence of cover made any approach extremely dangerous, W/O Maguire and Sgt Brown together voluntarily took the foam hose to within five yards of the fire and soon extinguished the flames. Both these airmen suffered burns on the hands as a result of their actions.

Lt. K. LAWLOR, S.A.A.F.

B.E.M. (Mil.)

L.A/CW. K. L. MCKINLAY, W.A.A.F., No. 961 Sqn.—One day in 1944, during the course of one hour, some 50 shells fell in the Dover area and damage and casualties were sustained at the squadron's headquarters; the medical officer was killed. L.A/CW McKinlay, a motor driver, although wounded in the right hand and left thigh, acted as ambulance driver and succeeded in removing all the casualties. This necessitated several journeys under shell fire to an E.M.S. hospital some one and a half miles away. It was not until the shell fire had ceased and all casualties had received attention that L.A/CW. McKinlay could be persuaded to have her own injuries attended to.

Cpl. K. BERRY, R.A.F.V.R. (For citation, see Act. Flt Lt. A. J. P. Furneaux, O.B.E.)

Act. Sgt. A. BROWN, R.A.F.V.R., R.A.F. Regt. (For citation, see Act. W/O P. Maquire, R.A.F., R.A.F. Regt.)

Army Awards

THE KING has been graciously pleased to approve the following awards in recognition of gallant and distinguished services in the field:—

Distinguished Flying Medal

Staff-Sgt. A. MCCULLOGH, Army Air Corps
Sgt. W. PURVIS, Royal Army Service Corps

Roll of Honour

Casualty Communiqué No. 484

THE Air Ministry regrets to announce the following casualties on various dates. The next of kin have been informed. Casualties "in action" are due to flying operations against the enemy; "on active service" includes ground casualties due to enemy action, non-operational flying casualties, fatal accidents and natural deaths.

Of the names in this list, 107 are second entries giving later information of casualties published in earlier lists.

Royal Air Force

KILLED IN ACTION.—W/O. E. Poole; Sgt. J. H. Ace; F/O. J. D. M. Barber; F/O. N. C. Blackband, A.F.C.; Flt. Sgt. R. J. Cook; Sgt. M. Cottingham; Sgt. P. E. Durman; P/O. F. Farish; Sgt. C. E. J. Gray; F/O. W. G. Heatley; Sgt. G. L. Hislop; F/O. R. McGowan; Flt. Sgt. W. A. McLaren; Sgt. D. T. Mulligan; Sgt. C. G. M. Ogilvie; Act. F/O. C. E. T. Peters; Flt. Sgt. G. H. Redford; W/O. J. D. Rice; Sgt. G. M. Saunders; F/O. M. D. Singleton; Flt. Sgt. S. G. Watts.

PREVIOUSLY REPORTED MISSING, BELIEVED KILLED IN ACTION NOW PRESUMED KILLED IN ACTION.—Act. Flt. Lt. C. Bush; Flt. Sgt. G. O. Clark; Flt Sgt. D. A. Dawson; Sgt. A. Dean; Sgt. G. A Fidler; Flt. Sgt T. S Fletcher; Sgt. E. A. Gauld; W/O. J. W. Gibb; Act. Flt. Lt. A. Hilton; Sgt. E. R. Hughes; P/O. A. D. Johnson; F/O. J. G. R. Ling; Sgt. N. F. Lingley; Sgt. L. Moss; Sgt. F. A. Paskell; Sgt. I. Prada; Sgt. R. P. Rees; Act. Sqn. Ldr. A. D. Saunders; Flt. Sgt G Slater; Sgt. A. Spence; Act. Flt. Lt. E. Stead; Sgt. J Torrance; Sgt. K. A. Ward; P/O W B. Yates.

PREVIOUSLY REPORTED MISSING, NOW PRESUMED KILLED IN ACTION.—Flt. Sgt. G. Bailey; Act. Flt. Lt. R. L. Barnes; Sgt. C. Bolder; Sgt P. R. Bourne; Sgt. C. T. Bowman; Flt. Sgt J. S. Bradley; Sgt. V. De P. Brown; Sgt. A. B Burke; F/O. F. Chambers; Sgt. W. E. Cheal; F/O. F. M. Connolly; Sgt. W. A. Cox; Sgt G. E. Crawford; Sgt. W. S. Crockford; Sgt. J. B Croft; Flt. Sgt G. S. Cunningham; Sgt. E. W. Curzon; Sgt. H. V. Dawe; Sgt. R. V. M. Daniels; Sgt. J. T. Darwood; Sgt. T. J. G. Davies; Act Flt. Sgt. A. Dawson; Sgt. F. C. Diggle; Sgt. G. A. Elliott; Sgt. H. Ellison; Sgt. V. Favager; Sgt. D. Gibson; Act. Flt. Sgt. L. A. Hazell; Sgt. J. Hewitson; Flt. Sgt. D. B. Jameson; Sgt C. R. W. Jones; Flt Sgt. W. D. L. Lloyd; Flt. Sgt. F. McPhee; Sgt. A. J. H. Merricks; Sgt. W. Phillips; P/O. F. D. Rawlings; Sgt. A. G. Redman; Flt. Lt. L. N. Row; Flt. Sgt. P. H. Savage; Sgt. E. Shatz; Sgt. W. R. Shore-Marston; Sgt. E. H. V. Smith; F/O. F. Spencer; Wing Cdr. J. B. Tatnall, O.B.E.; Sgt. T. White; Flt. Sgt. J. K. S. Williams.

PREVIOUSLY REPORTED MISSING, NOW REPORTED KILLED IN ACTION.—Flt. Sgt. P. J. Hermolle.

MISSING, BELIEVED KILLED IN ACTION.—Flt. Sgt. F. R. Abbott; Sgt. T. R. Borkett; Sgt. T. Boyle; Sgt. P. N. Fudge; P/O. J. Gilbody; Sgt. L. P. Hyde; Flt. Sgt. E. S. McCleave; Flt. Lt. D. H. McLeod; Flt. Sgt. J. Musk; F/O A. Pirie; Sgt. K. K. Thomson.

MISSING.—Sgt. B. J. Armstrong; L.A/C. R. W. Baker; W/O. J. A. Beer; Sgt. P. E. Bell; Flt. Sgt A. F. Birdseye; W/O. E. S Bruton; Sgt. D. G. A. Bryer; Cpl. J. E. M. Burgess; L.A/C J. C. Burnett; A/C.1 W. C. Butler; Sgt. H. J. Chandler; Flt. Lt. P. Chinn; Sgt. S. J. M. Cooper; Cpl. J. Crean; L.A/C. G H. Colbear; F/O. G. S. Cozens Hardy; Flt. Sgt. H L. Davison; L.A/C. L. F. Davison; Flt. Lt R. H. Dodsworth; F/O. C. D Dowse; F/O A. J. Enser; Sgt. B. Espin Hempsall; Cpl. E. J. Evans; Sgt. N. S. Evans; Cpl. W. A. Fallows; Flt. Sgt. R. F. Fountain; Cpl F. G Gamble; Cpl. D W. Gillard; Sgt. A. D. W Gillibrand; Cpl. W. H. Gomer; F/O. T. H. Grace; A/C.1 J. Grahames; Flt. Sgt W. E. Gray; Cpl. H. P. Grimshaw; Sgt. R. G. Hawkes; Sgt. R. W. C. Heath; F/O. W. C. Heath; F/O. D. H. Hobden; Cpl F. T. Hockey; F/O J. A. Hollingworth; Flt. Sgt. A. Hoy; F/O. J. Hoyland; Flt Sgt. R. Hunter; Sgt. R. T. Jackson; Sqn Ldr. D. H James; Sgt. B. L. Jay; Sgt. A. J. Jeffery; F/O. V. C. P Jewers; Act. Cpl. F. Johnson; F/O. H. F. Jones; F/O. W. H. A. Jones, D.F.C.; Cpl. C. W. Kohn; Flt. Lt. J. B Lamb; Sqn. Ldr. C. G. D Lancaster, D.F.C.; Air Chief Marshal Sir T. Leigh Mallory, D.S.O.; Cpl. J G. McDonald; Flt. Sgt. I. A. McDowall; F/O W. McGillivray; A/C.1 G. McKean; L.A/C. G. Marshall; F/O L. A. Martin; Sgt. R. B. Mason; P/O. J. Miles; Flt. Lt. K. A. Mooring; L.A/C. C. Murrell; F/O. J. Negus; Cpl. A. Owen, B.E.M.; Sgt. T. B. O'Donnell; Cpl. A. C. Parry; Cpl. A Petrie; Cpl. D. J Philipson; Sgt. A. E. Piggin; Sgt. P. M Piper; L.A/C. A. J. Polley; F/O. J. H. Powner; Flt. Sgt R. C. Raffan; F/O. F. Roberts; Flt. Sgt. J. D Robertson; P/O. J. W. Robertson; Sgt. J. A D. Ross; Cpl. A. Rutherford; F/O. S. H. Sharpe; Cpl C. J. Spillman; Sgt. K. Steel; Flt Lt. F. C. W. Stewart; W/O. C. J Stirk; Cpl. A. Turner; Flt. Sgt K. H. Turner; Sgt. E. F. Vevers; Sgt. W. J. Warlow; Flt. Sgt. L. C. Welham; Flt. Lt. J. M. Wilson; F/O. E. Winton; A/C.1 A. Wood, Sgt. L. Worley.

The badge of No 138 Sqn., R.A.F.—"For Freedom"

MISSING, BELIEVED KILLED ON ACTIVE SERVICE.—Sgt. F. E. Bave; W/O. A. G. Boyce; Sgt. C. Carman; Flt. Sgt. M. D. Fletcher; Sgt. S J Greedy; Flt Sgt C. L. Jones; Act. Flt. Lt. R. F Marrack; W/O. O. C. B. Williams.

KILLED ON ACTIVE SERVICE.—F/O. F. A. Brock; A/C.1 G. B. Brown; Flt. Lt. G. J. D Bryant; L.A/C. E. Carter; Flt. Sgt. F. Chadbourne; L.A/C W. Chambers; F/O. R. Coates; Sgt L. S Coathup; L.A/C. J. B. Conlon; P/O. J. Darlington; L.A/C. D. K. V. Edwards; L.A/C. J. T Gates; Sgt. E. N. Genno; Sgt. J. Hill; F/O. P. H. Hoyle; L.A/C. E. J Hulme; Cpl. G. J. D. Hutton; F/O. R. K. James; W/O. M. S. Jones; L.A/C C. H. Judson; Sgt W. P. Kendrick; F/O. J. T. Lewis; L.A/C. J. McGrath; L.A/C. W. Maddison; F/O. L. M Mason; Flt. Lt. W. J. Matthews; Flt Sgt. C. W R. Millard; L.A/C. H. Moffett; F/O. N. F. N Morris; Sgt. R L. O'Sullivan; F/O. H. Overend; Cpl. G. H. Payne; Sgt. A. W. Payton; Cpl. B. Pipe; W/O. R. W. Posse; F/O. B. Ray; Sgt. E. A. J. Raymer; Sgt. K. E. D. Saines; Sgt. A. F. Simpson; Sgt. F. G Smith; Sgt V. T. Spragg; F/O. L B. Stone.

PREVIOUSLY REPORTED MISSING, BELIEVED KILLED ON ACTIVE SERVICE, NOW REPORTED KILLED ON ACTIVE SERVICE.—Sgt. N. Curry.

PREVIOUSLY REPORTED MISSING, NOW PRESUMED KILLED ON ACTIVE SERVICE.—Sgt. D. A. Brooks; Sgt. J. A. Brown; Sgt. J E. Harling; Sgt. A. R. Saunders.

WOUNDED OR INJURED ON ACTIVE SERVICE.—L.A/C. T. P. Bryce; F/O. J. T. Coull; Sgt. R. L. Felce; A/C.2 J E. H. Moore.

DIED OF WOUNDS OR INJURIES RECEIVED ON ACTIVE SERVICE.—Flt. Sgt. R. Colquhoun.

DIED ON ACTIVE SERVICE.—Sgt. M. L. Gill; Cpl. E. Leckey; A/C.1 J. Lyon; L.A/C. G. M. Robertson; Sqn. Ldr. N. B. Silk; L.A/C. J. R. Smith; L.A/C. J. F. Syrett; L.A/C. E. A. Trunchion; L.A/C. G. G. Young.

PREVIOUSLY REPORTED MISSING, NOW REPORTED PRISONER OF WAR.—Sgt. F. W Brown; W/O. L. W. Cook; W/O. J. Hamilton; Flt. Lt. L. G. Matthews; W/O. J. Miller; F/O. J. J. O'Neill; F/O. J. G. Pilkington; F/O. R. J. Ramsey; F/O. H. D. Reeder, D.F.C.; Flt. Sgt. D. G. Reich; F/O. V. H. Thompson.

The badge of No. 280 Sqn., R.A.F.—"We Shall be There."

Royal Australian Air Force

KILLED IN ACTION.—Flt. Sgt J. K. Ladley; Act. F/O. R. D. Leake.

PREVIOUSLY REPORTED MISSING, BELIEVED KILLED IN ACTION, NOW PRESUMED KILLED IN ACTION.—P/O. H. C. L. Mackintoah; Flt. Sgt. S. V. Mackrell; Flt. Sgt. O. P. Smith; Flt Sgt. I. A. Thomson.

PREVIOUSLY REPORTED MISSING, NOW PRESUMED KILLED IN ACTION.—P/O. C. F. Blundell; Flt. Sgt. T. F. Eastcott; P/O. E. J. Layb; Flt Sgt. R. J. Newell; Flt. Sgt. J. E. Pogonowski; P/O. B. T. Sheekey; Flt Sgt. C. Sheldon; Flt. Sgt W R Sutton; Flt. Sgt. H. C. L Thomas; Flt. Sgt. P. K. Williams; Flt. Sgt. J. D. Wormald.

MISSING.—F/O. J. M. Beeston; Flt. Sgt W. P. Burton; Flt. Sgt. G. B Byrne; Act. F/O. A. G. Carter; Flt. Lt. J. A Casey; Flt. Sgt D N. Charlesworth; Flt. Sgt. H. K. Coombe; Act. F/O M. J Feddersen; F/O. A. H. Francis; W/O. I H. Gray; Flt Sgt. W. L. Houston; Act. F/O. P. L. McCartin; Flt. Sgt. R. J. Payne; Flt. Sgt P. F Smith; Flt. Sgt. M. R. Stedman; W/O A. E. J Stiles; Act. Flt. Lt. G. E. Williamson.

KILLED ON ACTIVE SERVICE.—Flt. Sgt. J. D. Pratt.

PREVIOUSLY REPORTED MISSING, BELIEVED KILLED ON ACTIVE SERVICE, NOW PRESUMED KILLED ON ACTIVE SERVICE.—F/O. M. A. Stokes.

PREVIOUSLY REPORTED MISSING, NOW PRESUMED KILLED ON ACTIVE SERVICE.—Flt. Sgt. A. C. Hall.

PREVIOUSLY REPORTED MISSING, NOW REPORTED PRISONER OF WAR.—W/O W Hodgson; W/O. S A. Silver.

Royal Canadian Air Force

KILLED IN ACTION.—Flt. Sgt. J. M. H. Delaney; F/O A. H. Leitch; Flt Sgt. R. E. Mooney.

PREVIOUSLY REPORTED MISSING, BELIEVED KILLED IN ACTION, NOW PRESUMED KILLED IN ACTION.—P/O. H C. Clay; F/O. W. G. Hicks.

PREVIOUSLY REPORTED MISSING, NOW PRESUMED KILLED IN ACTION.—Flt. Sgt. J. G. De Sieyes; P/O. F. J. Elms; P/O. A. K. Heaton; F/O. A W Hornby; Sqn. Ldr. L. M Linnell; Sgt. P. F. Wicks.

MISSING, BELIEVED KILLED IN ACTION.—F/O. W. K Marshall.

MISSING.—P/O. P. Barnicke; Flt. Sgt. R. A. Best; F/O. B. S. Corbett; Sgt. A. A. Cooper; Flt. Lt J. W. Davidson; F/O J. R. Dunford; W/O. M. E. Gallagher; Flt Sgt. K. M. Grayston; Flt. Sgt L. W. Nelson; P/O. L. A. Ouellette; Flt. Sgt D. N. Page; L.A/C. N. F. Ready.

KILLED ON ACTIVE SERVICE.—F/O. L. J Adams; F/O. C. A. Bardwell; Flt. Sgt. H E. McDonald.

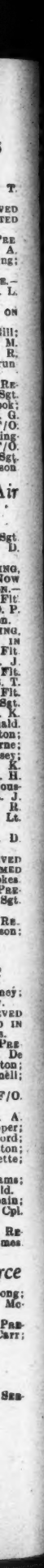
DIED ON ACTIVE SERVICE.—L.A/C. H Geekbain; F/O. R. D. Durrant; Sgt W. J. Marshall; Cpl. D. D. M. Taylor.

PREVIOUSLY REPORTED MISSING, NOW REPORTED PRISONER OF WAR.—P/O. J. S. Tames.

Royal New Zealand Air Force

KILLED IN ACTION.—Flt. Sgt. E. R. Armstrong; Flt. Sgt C J. Ashworth; Flt. Sgt. T F. McCormack; Flt Sgt A McLaughlin.

PREVIOUSLY REPORTED MISSING, NOW PRESUMED KILLED IN ACTION.—Flt. Sgt W. L. Carr; Act. Flt. Lt R J Taafe, D.F.M.

South African Air Force

MISSING, BELIEVED KILLED ON ACTIVE SERVICE.—Air Mech G. F. Henning.